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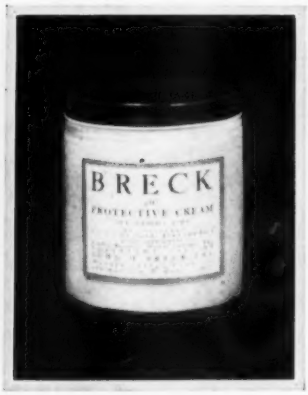

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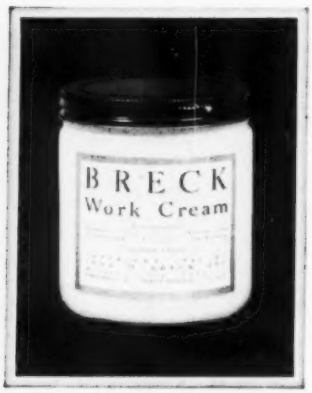

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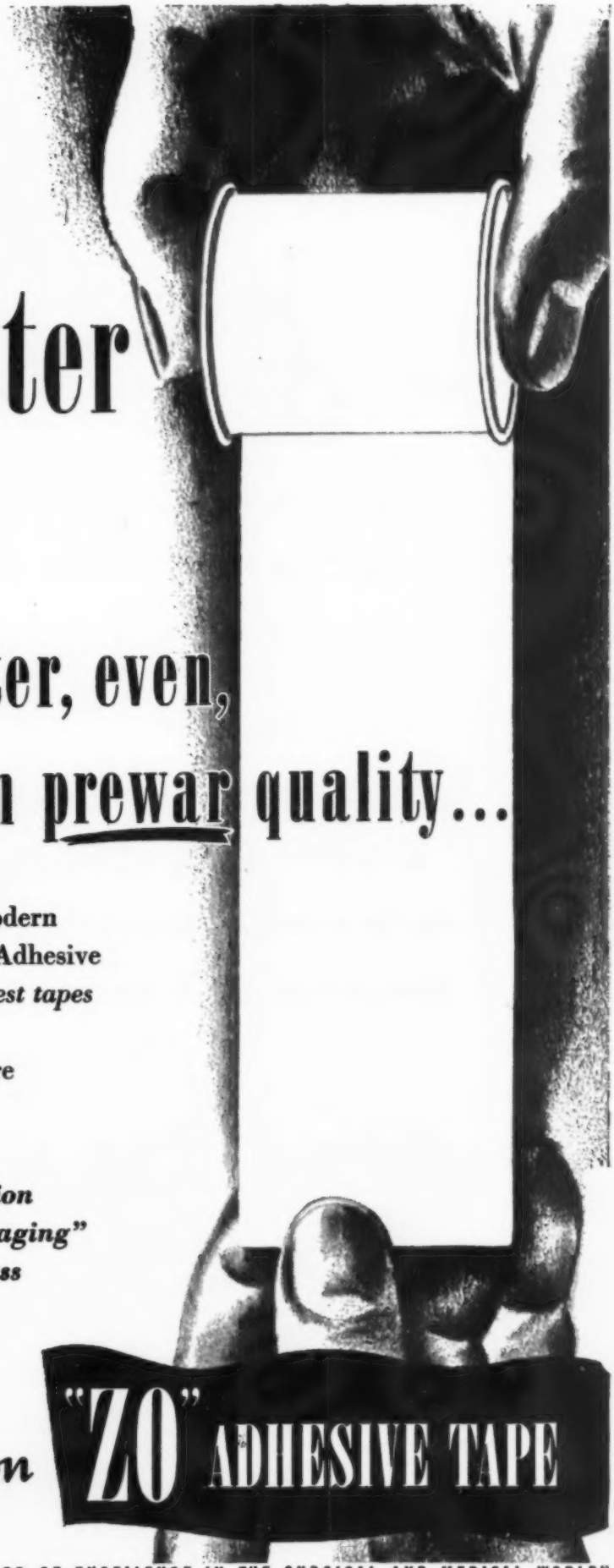

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COMING

American Association of Railway Surgeons
58th Annual Meeting—Chicago, November 23-25, 1947

American Association of Industrial Physicians and Surgeons
33rd Annual Meeting—Boston, March 28-April 4, 1948

[NOTE: The opinions expressed in the editorials of this Journal are not to be considered as necessarily representing the opinions of any associated organizations.]

THERE is one time-tested *good* way to establish an industrial medical department. That involves selecting a physician with enough industrial-medical background and experience to know what he is doing, paying him well, giving him complete authority to install his own staff and his own administrative and functional methods, and then holding him to account for results. If he's a good man he'll *get* results; and in order to be sure of this from the beginning he will consult with others, avail himself of all he can learn from what has been done, and adapt every consideration of advice and experience from all sources to the special needs of his own situation. That way of doing it hasn't as yet been improved upon. It has proved to be not only a *good* way, but the *only* way—if economic considerations are not to be ignored. And its application is by no means limited to privately-owned business — the fine medical department of Tennessee Valley Authority is an example. It is significant, in connection with Public Law 658, "to provide for health programs for government employees" (see page 406) that "the health program now being conducted by the Tennessee Valley Authority and by the Panama Canal Railroad Company shall be not affected by the provisions of this Act." We hope this exception was inspired, not by any political considerations, but by a genuine appreciation on the part of the law-minded legislators that there are actually some things in successful operation in our country that even departmental specifications can't improve on. Meanwhile, the practice of every government agency that can command a statistician and a slide rule is to prescribe and specify a course of conduct which confines the personal to routine, and squeezes the human into regulations. They just will do it. . . .

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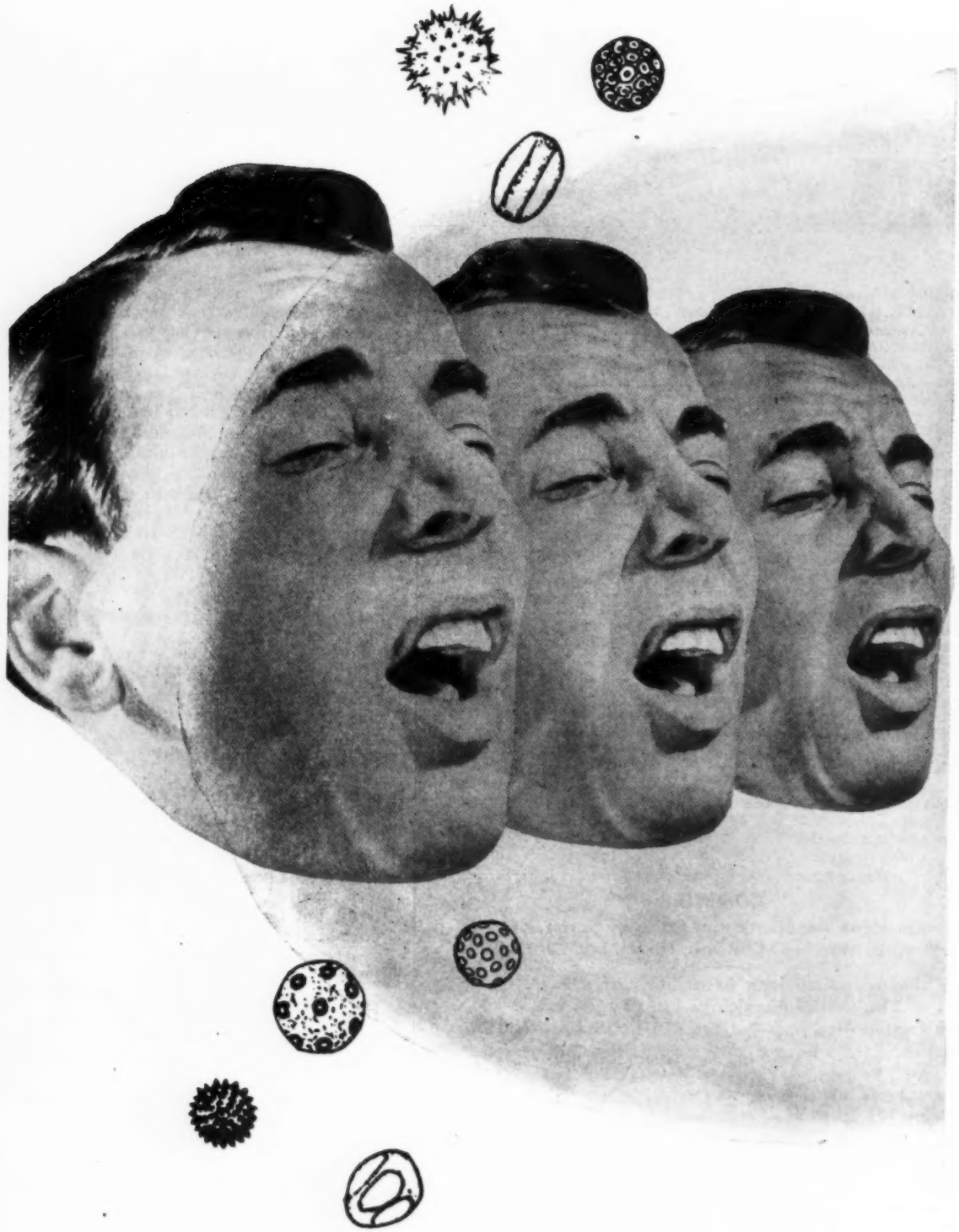

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DR. R. R. SAYERS, Medical Director, U.S.P.H.S., and Director of U. S. Bureau of Mines since 1940, has been granted leave without pay to accept the chairmanship of the medical board just established by the Trustees of the Welfare and Retirement Fund of the United Mine Workers of America.

DR. LOUIS W. SPOLYAR, Indiana Director of the Division of Industrial Hygiene, was elected President of the AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS during its annual meeting in Buffalo, New York. The membership of this group includes individuals employed in the various state divisions of industrial hygiene. Thus this group now represents 57 industrial hygiene units, functioning in 45 states, District of Columbia, Puerto Rico, Hawaii and Alaska. The purpose of the Conference is to discuss new problems associated with the administration and control of occupational diseases as well as other health problems involving the worker in industry. This is the first time that Indiana has been honored by having one of its members elected to this office. DR. SPOLYAR is a graduate of DePauw and Indiana Universities. Since 1938, he has been Director of the Division of Industrial Hygiene. He holds memberships in the Marion County and State Medical Societies, AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, and is a Fellow of the American Medical Association. He has contributed several articles to the scientific literature on industrial hygiene. Recently, he has been appointed Assistant Professor of Public Health to teach industrial medicine at the Indiana University School of Medicine.

—*Monthly Bulletin*, Indiana State Board of Health, May, 1947.

DR. HENRY H. KESSLER sailed for London, July 17, to speak before the British Council on Rehabilitation on July 25, at the British Empire Hall. Member of the American Academy of Orthopedic Surgeons and member of the Council on Industrial Health of the American Medical Association, DR. KESSLER is no stranger to international meetings, having served as Presidential Delegate from 1928 to 1939, to the International Congress of Industrial Injuries in Budapest, Geneva, Brussels, and Frankfort. His work at the Mare Island Naval Hospital during World War II, where he was

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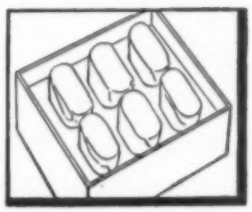

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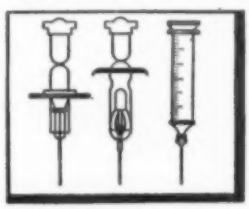

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Chief of Orthopedics, of Rehabilitation, and of the Amputation Service, has been widely publicized. His "cineplastic amputation" technique is unique in the field of surgery. At present, he is Consultant in Orthopedics and Prosthesis Services to the Federal Office of Vocational Rehabilitation, Washington, D. C., a member of the New Jersey State Rehabilitation Commission, and Attending Orthopedic Surgeon at the Hospital and Home for Crippled Children in Newark, New Jersey; and his election as President of the National Council on Rehabilitation, 1970 Broadway, New York City, has just been announced.

DR. KARL PFEIFFER, head of the University of Illinois Medical School's toxicology department, has been appointed to succeed DR. WILLIAM D. MCNALLY as head of Cook County's toxicology department. DR. MCNALLY'S resignation was submitted some time ago; DR. PFEIFFER'S appointment became effective July 15.

GOVERNOR THOMAS E. DEWEY has appointed ASSISTANT SURGEON GENERAL HERMAN E. HILLEBOE, associate chief of the Bureau of State Services of the U. S. Public Health Service, as Commissioner of the New York State Department of Health, the appointment becoming effective July 1, 1947. DR. HILLEBOE succeeds DR. EDWARD S. GODFREY, JR., who retired recently.

GENERAL

THE Brooklyn Cancer Committee has released its fifth monthly cancer control reminder to 5,000 firms for posting on factory, store and office walls. Each poster deals with a symptom which may be a sign of cancer. Successive tit'es have been "Why Wait for Pain?"; Have You a Healthy Mouth?"; "Can Cancer Be Prevented?"; "Have You Indigestion?"; and "Don't Hide Those Lumps!"

—*J.A.M.A.*, July 5, 1947.

"The Rascals"

DR. PAUL R. HAWLEY, medical director for the Veterans Administration, told physicians today that a "grasping and selfish" 10% of their number can give the profession "a bad reputation." He suggested that medical groups which attempt to charge the V.A. "all that the traffic would bear" might be in part the cause of "the clamor now in Congress for some regulation of the practice of medicine." In a speech for a conference of the presidents of state medical associations, DR. HAWLEY declared: "Had organized medicine devoted half as much energy toward kicking out the rascals as it has to protecting them, there would be no more danger of government

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control of medicine than there is of government control of the clergy."
Binghamton (New York) Sun, June 9, 1947.

Unlicensed Company Doctor

PROBLEM: Is a doctor in a company dispensary who diagnoses and treats an injury of an employee of the firm guilty of constructive assault and battery if he is not licensed to practice in the state? *Court Answer*: No. The employee did not claim negligence in the diagnosis or treatment. The court followed the reasoning of the California Supreme Court in a case in which it was decided, in substance, that holding or not holding a license to practice has no tendency to prove or disprove use of proper skill in treating a patient. (Tenn. Sup. Ct. 197 S.W. 2d 798, and 76 Cal. 304, 18 Pac. 329.) *Editorial Comment*: Appellate courts which have reached similar conclusions include the Court of Appeals of New York and the Massachusetts Supreme Judicial Court. (242 N.Y. 176; 151 N.E. 197; and 261 Mass. 40, 158 N.E. 270.)
—From *Modern Medicine*, July 1, 1947.

"Yoohoo!"

LIKE most nurses, I never realized that some patients knew me only as a white-clad office accessory. But one evening, after changing from my office uniform into street dress, I happened to meet an old patient of the doctor's on a crowded street corner. He passed me, did a double-take, then boomed in tones loud enough to turn bystanders' heads: "Why hello there, I hardly knew you with your clothes on!"
—Physician's Aide, Oklahoma, in *Medical Economics*, July, 1947.

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—American Journal of Public Health.

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COMMENT and OPINION

Patient Project

THE PRESIDENT'S recent socialized medicine message discloses that Mr. Truman still has to deal with the same element in his political party which was in control when he took over, although a large segment of it is currently shouting for Wallace and Russian "friendship." Socialized medicine as practiced under dictators calls for converting the ailing citizen into a government project. He would become the patient not of a doctor but of a bureau. All doctors would be drafted into the system and forced to reach their conclusions and apply treatment according to rules laid down in Washington. The money would come from a 3½% payroll tax. The effect would be, of course, to nationalize the healing art and make every citizen dependent on some public official for medical treatment.

—*Kittanning (Pennsylvania) Simpson's Leader-Times*, June 16, 1947.

Needs Promoting

WHAT to do about the medical care of employees of small industrial plants has been a long-time brow-furrower. Seldom do plants employing fewer than 500 need full-blown industrial medical departments; yet a sizable segment of the country's workers punch time-clocks in small establishments. Physicians in Philadelphia and Brooklyn have tinkered with part-time solutions that offer promise. They have found it practicable for a trained industrial M.D. to serve several plants at a time. As a guide, they use schedules developed by the National Association of Manufacturers and by the U. S. Chamber of Commerce. The schedules show the minimum time a physician and a nurse should spend at any plant, depending on the number of employees and on the type of business. Experience has shown that part-time service is worthwhile. What's more, manufacturers are learning (albeit slowly) that it fills a pressing industrial need. Vigorous promotion is the next step. It deserves a top spot on 1947's medical agenda wherever the wheels of small industry turn.

—*Medical Economics*, April, 1947.

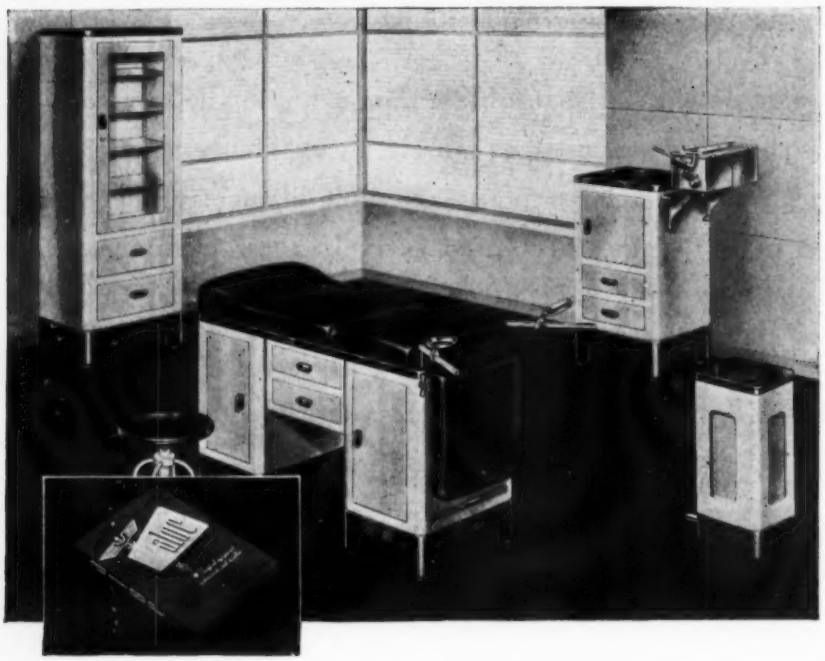
The Time Is Now

IN THE long history of medicine, we physicians are but characters in the play called, *As You Desire Me*. When society believes in evil spirits, we wear masks and beat drums to frighten them away; when it is persuaded of possession by witches, we bore holes in our patients' skulls to let the witches out; when it is given to materialism and worships the dynamo, we become engineers who approach the study of disease with mathematical equations and curves drawn on graph paper; when the emotional problems of living confront us on all sides, we turn to psychosomatic medicine. Finally, when society is forced by events to recognize its own disorder, then we physicians reluctantly crawl out of our libraries and laboratories and consulting rooms to talk to the people directly. Such a time is now with us.

—From "Medcial Information and Misinformation," by CARL BINGER, M.D., in *Mental Hygiene*, January, 1947.

"But Psychoneurosis!"

SCIENTIFIC specialists are subject to a peculiar occupational disease when it comes to the use of words. It is the disease of perversely using the wrong words to say the right thing. The disease has its source in a special kind of scientific pride: the price of being able to use technical terms that ordinary folk are supposed to view with awe. When the specialist uses such words he becomes a happily inflated ego. Sitting like Little Jack Horner in his scientific corner and looking out at the world of lesser people, he pulls out his plum of horrendous seven-syllable word and cries "What a big boy am I!" Technical words are good in their place. Their place is where professional accuracy is required. But technical words are bad when they cause confusion or fright or when they are simply not understood. Let me recall to you the word "psychoneurotic." It is a perfectly good word, absolutely necessary for professional use. But when the word is tacked on to a boy who has suffered an emotional breakdown in the army, it can do an enormous amount of harm. The boy goes back into



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civilian life a marked man. No average employer wants a psychoneurotic in his shop or factory; no school board wants him as a teacher. Why? Because of the terrifying sound of a word that neither employer nor school board rightly understand. A word used as a label that makes a victim of the boy who is labelled. It would have been wiser if our army psychiatrist had used the good old sympathetic word "shell shock." Anyone can understand what shell shock means. Anyone can realize that it is nothing to be ashamed of. But psychoneurosis! The psychiatric experts seem to forget that a word may not mean to the layman what it means to them as experts. They ought to have watched their word.

—From "How to Influence People. . ." by H. A. OVERSTREET, PH.D., in *Michigan Public Health*, May, 1947.

"Who Can't Get Medical Care?"

WANTED: Information concerning anyone who believes he cannot get needed medical care because he hasn't the means to pay his doctor." Some 750,000 California newspaper readers had a chance recently to scan a display ad built around that theme. It appeared in all four dailies published in Alameda County and was sponsored by the physicians of that region. The Alameda County Medical Association received exactly sixteen responses to its appeal. Ten callers wanted information on voluntary prepayment plans. One thanked the physicians for apprising him of reduced fees for persons of modest means. Five attacked the validity of the doctors' printed guarantee ("The physician of Alameda County unconditionally guarantee medical care to everyone"). None could cite a specific case that answered the "information wanted" plea. While the ad was appearing, Gov. Earl Warren broke the news that he intended to push a revised version of his compulsory health insurance bill. A spokesman for the Alameda society promptly addressed a letter to him reporting "an unsuccessful attempt to find just one individual" who needed his program. On the basis of public response to the newspaper ad, the spokesman concluded, "This individual does not exist." That statement drew an immediate retort from the Governor. The association "made a pretty quick survey," he remarked. It is "so obviously distorted for propaganda purposes, it hardly calls for an answer. Everyone knows there are many people in every county who need medical care they can't pay for." Countered a medical society officer: "Certainly there are many who cannot pay for medical care. But not one of these individuals in Alameda County is denied the care of a physician because he cannot pay for it." Public opinion pollsters might question the use of the ad results in lieu of scientific survey findings. But a number of Alameda M.D.'s were inclined to think the publicity given to health insurance, family doctors, and reduced fees for low-income patients made the ad well worth while.

—GEORGE LYNCH, in *Medical Economics*, May, 1947.

Model Clinic, Small Factory

HOW to furnish adequate medical service to workers in small factories has long puzzled industrial physicians and management. One solution that has stood the test of time was worked out by a New York general practitioner and the managers of a chemical plant with less than 400 on its payroll. For several years, DR. ANGELO A. ACAMPORA has handled compensation cases and emergency calls for a dozen small factories in Queens County. But at one plant he has gone a step further; he supervises an industrial rarity, a full-blown clinic operated by a part-time medical staff. The idea was born during the war, while the West Disinfecting Company of Long Island City, New York, was manufacturing chemicals for the Army and Navy. The Office of Industrial Health of the Public Health Service helped set up a demonstration clinic there. DR. ACAMPORA, who had treated some of West's compensation patients, agreed to act as part-time plant physician. By January, 1945,

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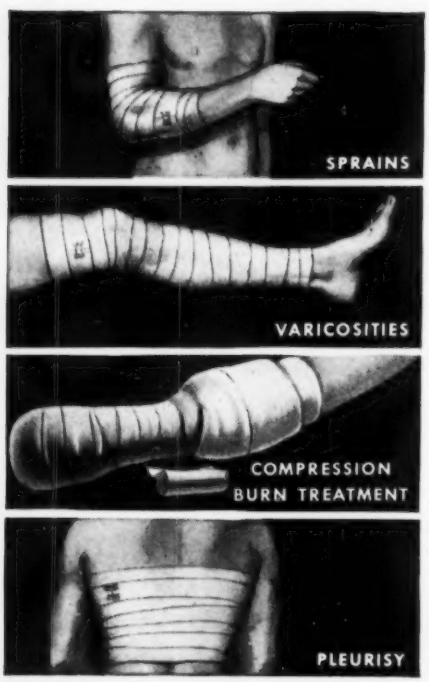

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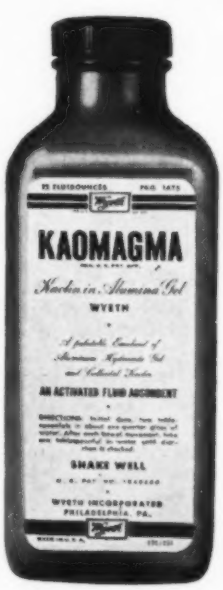

Bottles of 6 and 12 fl. oz. Dose: 2 tablespoonfuls in water, then 1 tablespoonful after each bowel movement.

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1897— SERVING THE MEDICAL PROFESSION FOR FIFTY YEARS — 1947

the West management was convinced that the results (a lower accident rate and a sharp drop in absenteeism) justified a permanent set-up. Today plant executives are well satisfied with their $5,000-a-year experiment. Here's how the medical staff operates. DR. ACAMPORA arrives at the clinic at 11:00 A.M., checks out at noon. A nurse assigned by the Visiting Nurse Service of New York puts in 27 hours a week. For first aid when neither doctor nor nurse is present, the clinic has trained a corps of factory and office employees. The clinic handles an average of 10 to 20 patients a day. Every case is seen by the plant physician. When the nurse works alone, she follows carefully laid-out instructions, makes sure each patient is seen by the doctor on his next visit. The same rule holds for the first-aid men who handle emergencies. For a serious accident, the doctor is, of course called immediately. Every West employee gets a pre-employment examination, including blood and urine analyses and x-rays. Any employee can get a complete annual check-up for the asking. Almost half of the West payroll has taken advantage of this. The West clinic is housed in five rooms on a 'tween-decks level between the first and second floors of the plant. Patients enter through a tiny reception room that doubles as the nurse's office. Off this is a waiting and recovery room for women employees, another one for men, plus a treatment room and an examination room. Since space is limited, only equipment required for physical examinations and treatment of minor injuries is kept in the clinic. Costs of maintaining the medical department (doctor, nurse, medicines, etc.) total $12 a year per employee. Management foots the entire bill. This outlay has been offset partly by decreased compensation insurance premiums. The New York State Labor Department cites the West company's medical service as an outstanding example of how doctors interested in industrial practice can devise part-time arrangements profitable to themselves and to the plants they serve. DR. VICTOR HEISER, of the National Association of Manufacturers, also commends the plan. "The experiment that produced this clinic," he points out, "was not broad enough to conclude that this is the ideal solution for all small industrial plants. It is, nevertheless, well worth studying by any doctor interested in the problem."

—EDWARD E. RYAN, in *Medical Economics*, May, 1947.

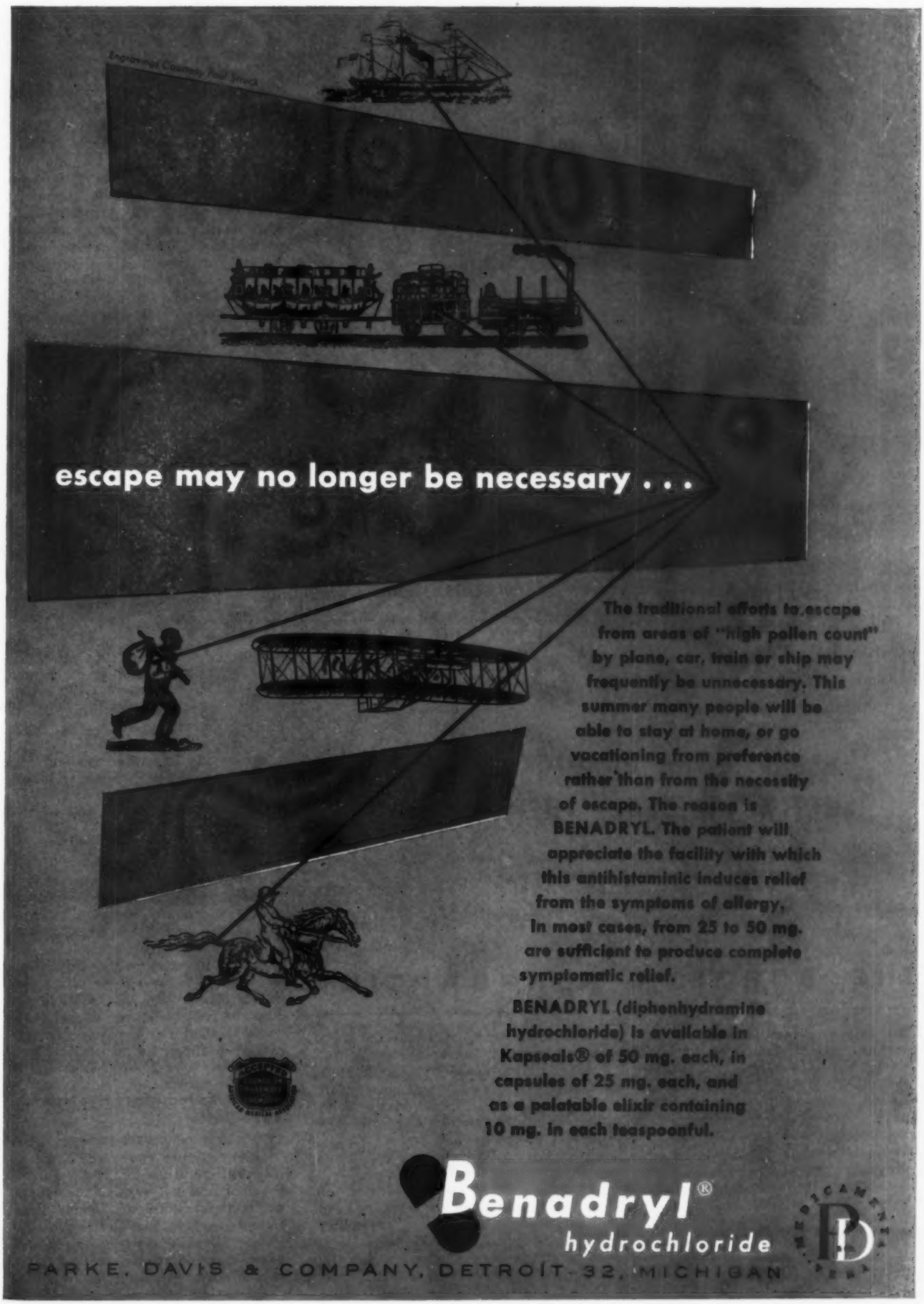
They're Against It

THE Committee on Medicine and the Changing Order (New York Academy of Medicine) concludes that compulsory medical insurance could not realize the promises made for it and would inevitably create new evils of its own. Any scheme of compulsory medical insurance at this time would lead to most unfortunate results. Schemes for pre-payment of medical costs by the enactment of compelling legislation and the collection of tax monies are deceptive in their simplicity. Although under compulsory medical insurance on a nation-wide scale a larger number of people receive medical service, the quality of service tends to decline. We know from European experience that under national compulsory medical insurance, even as the general level of medical practice is lowered, its costs are raised. A system of compulsory insurance presages the establishment of a vast and costly administrative machine. It would burden medicine with an overhead many times its present size and unlikely to yield benefits commensurate with its cost.

—From "Academy, After Four-Year Study, Warns Against Compulsory Medicine," in *Medical Economics*, June, 1947.

Impossible to Defeat

IN A DISCUSSION of the Truman health program on Columbia Broadcasting System's, "Cross Section, U.S.A.," CHARLES E. HODGES, President, American Mutual Liability Insurance Company of Boston, declared, as spokesman for the U. S. Chamber of Commerce, that this program was unsound and would undoubtedly lower the quality of medical treatment. Supporting his argument that direct governmental control over physicians, hospitals and all other groups providing medical care would result in a lower quality of medical treatment, he cited Great Britain's program of socialized medicine which Ernest Bevin described as "a tragedy of incompetence" par-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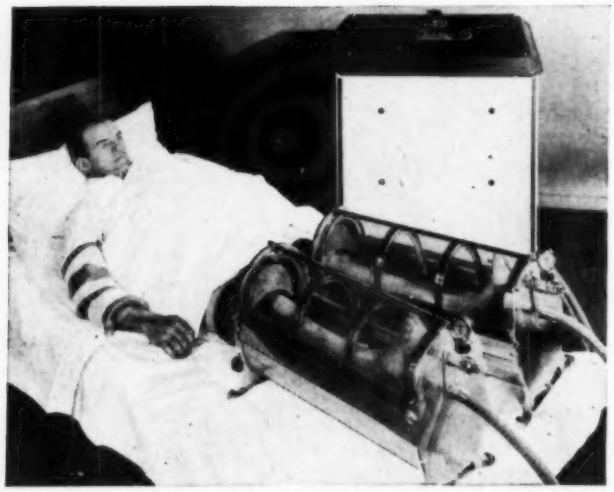

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ticularly as it applies to the medical service given British industrial workers. "If we envy the present sad plight of the British," he continued, "this would be a good bill to pass." Among the questions put to MR. HODGES was the following: "I understand that opponents of this program argue that it would create a tremendous governmental bureaucracy which would endanger our freedom. What are your views on that?" In reply he said, "I agree. It has been estimated that this proposed law would require some half a million or more government employees to administer. The 1947 version of this bill talks about state administration but actually the state administration must follow the national 'Party Line' or be liquidated. The tremendous political power that such a Medical O.P.A., could build up would be almost impossible to defeat at the polls."

The Communists Want It

FEDERAL funds and the services of 46 key government workers have been used unlawfully in spreading communist-backed socialized medicine. This was charged today by Representative Harness (R., Indiana), chairman of an investigating group of the House committee on expenditures in executive departments. Harness, whose report received approval of Representative Hoffman (R., Michigan), chairman of the full committee, named one government worker, Jacob Fisher, as a communist who has been acting in the movement for socialized medicine. Fisher holds a key post in the Bureau of Research and Statistics of the Social Security Agency. Harness warned: "It is our firm conclusion on the basis of evidence that communism holds socialized medicine as a cardinal point in its objectives." The Indiana Congressman said top workers in six Federal agencies have supported formation of so-called "health workshops" in various parts of the nation, which in reality are nothing more than pressure groups to back a national program of socialized mdiecin. Harness said the idea originated at the University of Chicago, adding that activities by the "health workshops" started in Washington in November, 1945. Subsequently, 13 meetings were held in Chicago, St. Paul, and Jamestown, North Dakota. Harness charged evidence thus far gathered showed the Federal Bureau of Research Statistics devoted its staff and resources freely to the preparation of pamphlets and propaganda material urging socialized medicine.

—*Chicago Herald-American*, July 16, 1947.

Getting Around

GENERAL MOTORS' movie "The Story of Kenneth Randall, M.D." (see "Doctor in Industry" INDUSTRIAL MEDICINE, 15:4, 264-267, April, 1946) "tracing the evolution of industrial medicine from the 'cigar box' first aid stations in 1910 to the present day modern medical departments" is being shown in neighborhood theatres.

—*Detroit Medical News*, July 14, 1947.

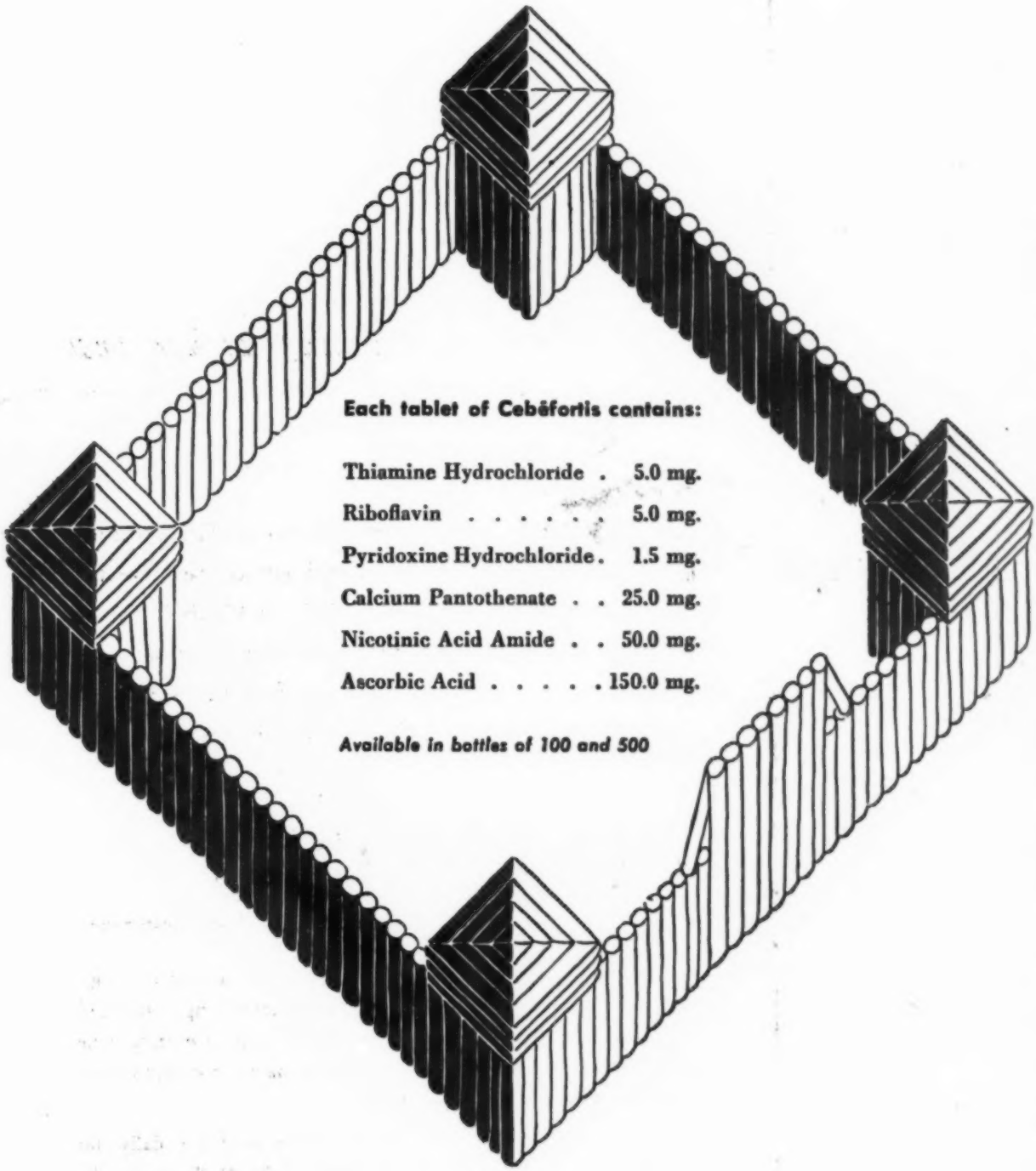
The WMD Socialized Medicine

PROFESSIONALLY Eligible. Physicians licensed by a state. (Vague phrasing says they are eligible if they "render any services included as general medical services," which appears to bring in osteopaths, perhaps chiropractors.) Specialists would have to meet *Federally established standards.* Also eligible are dentists, registered nurses and qualified practical nurses; qualified hospitals; qualified technicians.

—*Westchester Medical Bulletin*, July, 1947.

Tennessee Industrial Hygiene Conference

THE first Tennessee Industrial Hygiene Conference was held in Nashville on June 20, 1947. During the morning DR. PAUL C. CAMPBELL, JR., Chief, Office of Dermatology, Industrial Hygiene Division, U. S. Public Health Service, spoke on basic considerations of industrial skin diseases, outlining some of the predisposing causes of occupational dermatoses, defined *primary irritants* and *cutaneous sensitizers*, and con-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tinued with a discussion of the action of chemicals in contact with the skin. A summary was given of the role of biologic agents in the production of skin conditions. Some criteria to observe in the diagnosis of occupational skin diseases were reviewed, with precautions to be observed in patch-testing. Prevention was the subject of his concluding remarks. The lecture was illustrated with an array of pictures, most of them in color. In his talk on one phase of the research work of the Tennessee Valley Authority at Wilson Dam, Alabama, MR. R. B. L. FLEMMING, industrial hygienist, reviewed the role of elemental phosphorus as an industrial poison, stating that the literature was concerned primarily with exposure to high concentrations of phosphorus. In his work the major problem had been to determine the effect of exposure to small concentrations over prolonged periods. His work with experimental animals had revealed that there was apparently a critical stage with respect to phosphorus exposure and that such animals as survived could then withstand much higher dosages. The role of the physician in industry was discussed by DR. A. K. MEYER, medical director, Cellophane Division, E. I. du Pont de Nemours & Company, Old Hickory. His experience had revealed that much could be accomplished by realizing in the beginning that workers are human beings with all the abilities and shortcomings common to the human race and not just special entities that somehow don't fit this pattern. A friendly interest in the workers, their jobs, the welfare of their families, and their hobbies will contribute much to the success of an industrial medical program. 'This human interest will do much to break down the ice, so to speak, that may exist between worker and the medical department.' It is only after the confidence of the workers has been obtained that a medical department can function most effectively in all of its many ramifications. The afternoon session was highlighted by two excellent speakers. DR. DUDLEY A. IRWIN, medical director, Aluminum Company of America, Pittsburgh, began his lecture by reviewing the experiments carried on by various investigators to determine just how silica functions in the lungs to cause a proliferative reaction of the tissues. He outlined the results of experiments on the solubility of quartz and the effect of the presence of minute amounts of aluminum metal powder in markedly decreasing the solubility of this mineral. Apparently this effect of aluminum metal explained its action in the prevention of silicosis. DR. IRWIN illustrated his lecture with pictures and diagrams that added much to the effectiveness of his discourse. In discussing the subject, DR. J. H. MOODY, representing the Southern Potteries, Erwin, Tennessee, stated that their use of aluminum metal powder prophylaxis had not been long enough to permit conclusions at this time. DR. C. W. STRAUSS, medical director, Tennessee Copper Company, Copperhill, Tennessee, said their use of aluminum medication was purely a secondary line of defense and not a substitute for complete and effective engineering control of the working environment. The dust control program of this company has been studied by the Industrial Hygiene Service and found to be effective in confining dust to innoxious concentrations throughout the operations. DR. STRAUSS revealed that his company had made aluminum metal powder facilities widely available and had treated about 40 men from North Carolina, South Carolina, Virginia, and Texas, most of whom had reported marked benefits. MR. H. H. VALIQUET, Employers Mutual Liability Insurance Company, Milwaukee, presented an illustrated lecture on the practical aspects of industrial ventilation. The pictures reevaled that many problems had been solved by the use of ingenious devices which in many instances employed heat, or convection currents, as the motive power. MR. VALIQUET stressed the importance of employing natural forces in applying workroom ventilation.

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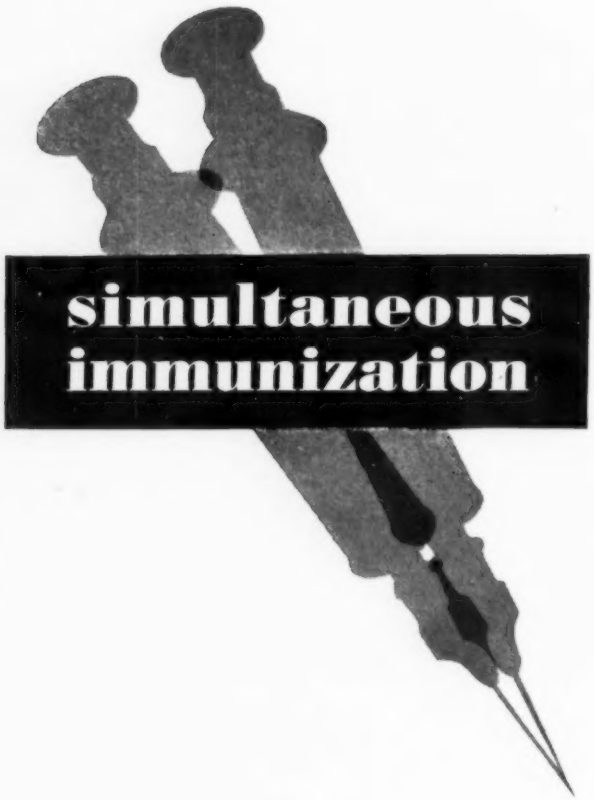

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This magazine is published to promote sound thought upon and concerning industrial medicine and traumatic surgery. To that end it will contain articles, news items, reports, digests, and other presentations, together with editors' comments. The editorial policy is to encourage frank discussion. On this basis contributions are invited.

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The Journal of Industrial Health, Occupational Medicine and Traumatic Surgery

With which are consolidated "The Industrial Doctor" and "International Journal of Medicine and Surgery."

The Science, the Law and the Economics of Industrial Health

Volume 16 August, 1947 Number 8

Progress in the Teaching of Industrial Medicine in American Medical Colleges

MILTON H. KRONENBERG, M.D.,
Assistant Medical Director,
Caterpillar Tractor Company,
Peoria, Illinois

IN MEDICINE we have demonstrated that it is possible for a profession like ours to have a profound influence on medical schools and educational programs throughout the nation, and even to propose legislation if need be for the proper training of those entering the profession. All we have to do is look back a few decades for a telling and significant contrast. Coordination and teamwork have given us advanced medical education in Class A schools, with the imposition of a prescribed pre-medical course, bedside clinical teaching, and required internships. All this has been done through and with a sincere desire to raise and maintain high standards of professional achievement. As a result the confidence of the public has been gained and our prestige established. To continue adding to these accomplishments we must at all times keep ourselves alert to the preparation of those in training.

When we consider the widespread interest, publicized events and professional group activity in connection with industrial medicine, together with the vast amount of literature on the subject and its related phases, it is surprising that courses in industrial medicine have not been more fully organized and developed by the curriculum makers for the undergraduate student. This should call for action and guidance by medical deans and curriculum committees. The recognition of the medical importance in our ever-expanding industrial mechanization is also their responsibility.

Medical education must be molded to the needs of our fellow men which American Medicine cannot ignore. Among the instrumentalities through which there are the greatest hopes of attaining leadership and supremacy in lengthening the span of life and preventing premature bodily decay, stands industrial medicine.

It is not necessary to predict what form the medical care of the future will assume, but it is important that students should *not* be trained for the type of medical practice of the past 25 years. They should be equipped and prepared to meet the needs of the coming 25 years, so that the product of medical schools may be better able to cope with the demands made by present-day changes. This calls for school administrators and others with vision, resourcefulness and imagination.

We have heard it said that the bulk of industrial medical practice is being carried out by physicians not directly associated with industry. Nevertheless, however capable such physicians in the field of medicine, their unfamiliarity with industry itself, its machines and manufacturing materials, eventuates in distressing injustices against industry as the chief victim, as well as against the employee. As a result, compensation courts are continually cluttered with spurious claims made by ill-advised employees, and abetted by well-meaning physicians committed to absurd diagnoses. Contrariwise, some employees are denied the just benefits of compensation because of failure to recognize in them the tell-tale markings of genuine industrial illnesses. To have this continue can hardly be spoken of as progress.

There can be no doubt that industrial medicine will remain a specialty for those who will devote all of their interest to it. However, the undergraduate curriculum must of necessity provide sufficient fundamental courses of instruction in industrial medicine to satisfy the requirements of physicians entering practice. Such physicians need not necessarily establish a specific affiliation with industry in order to utilize effectively a reasonable knowledge of industrial medicine.

There should be provided in the modern medical school curriculum sufficient teaching in industrial medicine by presenting at least its scope, its ramifications, its main objectives, its future and its role in preventive medicine and also how it has humanized industry. This would allow the student to evaluate this branch of medicine for a future field, as he does in choosing dermatology, neurology, obstetrics, etc., for specialization.

Obviously, conditions within and particularly surrounding medical schools may vary greatly so that no one plan or system can be supplied. But the necessary

Presented at the Thirty-Second Annual Meeting of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, Buffalo, New York, May 1, 1947.

education cannot be obtained by sporadic efforts or fragmentary instruction; nor can it be accomplished successfully by placing the responsibility on the medical faculty as a whole. Instead, organized procedures must be employed which will afford the student an experience comparable to that gained in other well-organized courses of the curriculum. This takes time and is not always easy to arrange, but something can be done in its direction.

This problem of more adequate teaching of industrial medicine is not new. For many years in the past it had been discussed by the International Association of Industrial Accident Boards and Commissions at their annual meetings. In speaking upon the question of better preparation of medical students upon this phase of medicine at the fifteenth annual convention of this organization back in 1928, Mr. Ethelbert Stewart, U. S. Commissioner of Labor Statistics said, "I have never in my life had a physician ask me what I did, what my job was; it may be that some doctors do ask a patient about his work, but the whole question of occupation as an element of illness seems to be ignored except by plant physicians, and I wonder if they reach 1% of the people working." At its 1928 convention, this organization was authorized to circularize the principal medical schools, calling attention to the situation in regard to the lack of courses in industrial medicine and requesting that at least a minimum of class work along this line be included in the curriculum. Letters were accordingly sent in December, 1928, to 72 medical schools. Replies were received from 44. Of these, four stated that they had a course in industrial hygiene or occupational diseases; in eight the subject was included in history-taking of patients; four said they would consider the matter; while five definitely stated they would enlarge their work along this line. A number replied that, while there was no definite course, the subject was included in other topics by way of lectures, examination of patients, visits to industrial plants, etc. Seventeen requested suggestions as to ways in which the subject could be introduced to their students.

The association at that time appointed a medical committee which was instructed to plan a course of study that would be suitable to present for the purpose of familiarizing students with the problems of industrial medicine. It is unfortunate that this impetus had to come from a lay group. The medical committee realized that its task would be a difficult one. Others had endeavored to outline a program previously and have it accepted by the faculty. All of them met with only varying degrees of success. One of the obstacles to the inclusion of a course was the fact that the average medical curriculum was already overcrowded. Another claimed that it was not suitable for undergraduate training and could only be adequately studied after graduation, because it was a specialty. I am sure DR. BROWN and the discussants will have more to say about this.

Within recent years the Council on Industrial Health of the American Medical Association and the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS felt the need for a unified plan of action to encourage regular hours of instruction in the undergraduate years, and they are continuing their efforts in that direction.

In 1939, the Council on Industrial Health of the American Medical Association tabulated the required and elective courses in industrial health reported by 59 medical schools in the United States. The findings revealed little or no uniformity of practice in undergraduate teaching, but showed variations ranging all the way from no organized instruction to 30 hours spent in the laboratory or on field trips.

In 1941, DR. FRED WAMPLER of the Medical College of Virginia tabulated his questionnaire results from 76 medical schools in the United States and Canada. Fifty-one schools reported varying number of hours assigned, ranging from two to 30. The average was 6.7 hours per school. Twenty-eight of these 51 medical schools took their students on one or more field trips.

Twenty schools reported an increase in the hours given to the subject of industrial health, and one reported a decrease.

Thirty-five of the medical schools teaching industrial health offered it in the department of preventive medicine and public health. In seven, it was given in the department of bacteriology and hygiene, and four give it in three or more departments. Two schools offered instruction in the course on general medicine.

Two schools gave the course in the sophomore year, 11 in the junior year and 16 in the senior year. Nine of the schools gave the course in two or more years in the curriculum.

Two schools reported having separate designated departments for teaching industrial health.

Seven schools offered industrial medicine as an elective with a limit enrollment. One afforded the student a clinical clerkship of a month's duration.

Nineteen reported either no definite assignment in teaching industrial medicine or reported some work done which did not lend itself to tabulation. Some in this group said they were planning to institute teaching of this subject in the very near future.

In 1943, additional data was collected by the American Medical Association and compared with their 1939 tabulations. The 1943 report indicated that more time was being devoted to industrial medicine. The average number of hours of required lectures in the schools reporting increased from five in 1939 to 9.6 in 1943. This increase was due to the extension of hours in 26 schools and the fact that 12 which did not include industrial health in the 1939 questionnaire survey did include it in 1943. On the other hand, seven schools devoted less time according to the 1943 report and three schools discontinued such teaching, the decrease seemingly being due to the loss of teaching personnel. With few exceptions the subject was being taught in the school departments of public health, preventive medicine or comparable departments. However, at that time five schools reported having designated industrial health departments.

In 1945, the Committee on Medical Education of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS also forwarded a questionnaire to 69 medical schools in the United States. Fifty-one replies were received. I might digress here for a moment and say that while questionnaire surveys may have numerous deficiencies, they can and do indicate certain trends and events taking place. The more desirable method, naturally, is through personal contact. This will be related by the next speaker.

In order to visualize trends in the 1945 questionnaire, material from 49 of the 51 schools which replied has been selected for tabulation, since these schools also were recorded in the data collected by the American Medical Association.

Lecture Hours Offered

OF THE 49 schools which responded, 15 indicated giving the same number of hours as reported to the A.M.A. and continued to offer an average of 6.2 hours

per medical school. Fifteen schools reported a decrease in hours, reducing their courses by 4.8 hours per medical school; 19 schools reported an increase in hours, averaging 4.5 hours over and above those tabulated by the A.M.A. By further computing the data collected among these 49 schools, we are faced with the sad, but true, finding that we have increased our undergraduate teaching in industrial medicine by less than one-third of an hour. No doubt, this will offer much food for thought.

The teaching departments remain the same in both tabulations, the largest number of courses being given in the departments of preventive medicine and public health.

Conclusion

IF MEDICAL education is to be progressive and useful and meet present-day needs, industrial medicine must be introduced and expanded in the undergraduate curriculum.

Educators should expect and receive the wholehearted cooperation of qualified individuals in industrial medicine and allied fields.

The existing apparatus for this can be found among the membership of this association.

An Interim-Progress Report of a Survey of Undergraduate Education in Industrial Medicine in Medical Colleges

ERNEST W. BROWN, M.D.,
Headquarters, Council on Industrial Health,
American Medical Association

THE immediate objective of the present survey is to obtain data on the present situation with respect to the undergraduate teaching of industrial medicine in the medical schools of this country and Canada. This has been previously explored by several agencies utilizing the questionnaire method.

Although considerable data were assembled in 1945 by the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS by this procedure, it was jointly considered essential by the Council on Industrial Health and the Association to supplement these returns by direct visits to medical schools for interviews with faculty personnel in order that sufficiently detailed data be accumulated as a basis for a sound evaluation.

The author was assigned to this task and thus far has conferred personally with the teaching authorities of 25 medical schools and has received complete reports from three additional. The present paper, therefore, is based upon the information obtained from these 28 of the 70 medical colleges of the United States and the nine in Canada, or 35% of the total. It may be regarded as an interim-progress report, presenting certain trends and impressions but no final conclusions or recommendations.

The term "industrial medicine" as here applied is in the broad inclusive sense, that is, it comprises medical administration, health conservation, industrial hygiene and clinical industrial medicine and surgery. It appears pertinent at this point to quote the definition of industrial or occupational medicine contained in the Proposed Essentials for a Residency in Occupational Medicine recently submitted by the Council on Industrial Health to the Council on Medical Education of the American Medical Association, as follows:

"Occupational medicine deals with the restoration and conservation of health in relation to work, the working environment, and maximum efficiency. It involves prevention, recognition and treatment of occupational disabilities and requires the application of special techniques in the fields of rehabilitation, environmental hygiene, toxicology, sanitation and human relations."

Of the 28 medical colleges surveyed, one was in a western city, eight were in the middle-west and 19 were in the northeastern part of the country. All but one of this last group are distributed between Washington, D.C., Baltimore, Philadelphia, New York, New Haven and Boston.

The Type of Data Collected

TOTAL number of clock hours assigned to instruction inclusive of lectures, field work, clinical work, etc.

(b) Technique of instruction, as by lecture, seminar, laboratory, field or clinical work.

(c) Proportion of hours distributed between lectures, field work, clinical study, etc.

(d) Title of Department teaching industrial medicine.

(e) Whether a separate curriculum is listed under full-time or part-time specialistic direction.

(f) Type of curriculum, whether fully integrated, on a lower restricted level, or with no attempt at organization.

Hours Allotted to Industrial Medical Teaching

THE total number of clock hours includes all instruction whether by lectures, seminars, field, or laboratory or clinical work.

FIELD TRIPS

A.M.A.		A.A.I.P.S.	
SCHEDULING	*NOT SCHEDULING*	*SCHEDULING*	*NOT SCHEDULING*
18	31	30	19

LABORATORY DEMONSTRATION, CLINICS, CLERKSHIPS, ETC.

A.M.A.		A.A.I.P.S.	
ARRANGED FOR	*NONE OFFERED*	*ARRANGED FOR*	*NONE OFFERED*
8	41	16	33

PROPOSED PLANS FOR EXTENSION OF PROGRAM

A.M.A.		A.A.I.P.S.	
CONTEMPLATE EXTENSION	*NO PLANS*	*CONTEMPLATE EXTENSION*	*NO PLANS*
10	39	23	26

TABLE 1.
INDUSTRIAL MEDICINE—28 MEDICAL COLLEGES
CLOCK HOURS OF TEACHING

Hours	No.	%
None	3	11
1-2	2	7
4-6	5	18
8-12	8	29
15-18	6	21
20-33	4	14

It will be noted in Table 1 that three schools provide no instruction whatsoever. The amount of time allotted in the remaining 25 ranges from one to two hours in two schools, up to 20 to 33 hours in four. Eight, or 29%, offer eight to 12 hours. This wide variation in teaching time reflects the extreme differences in recognition of this field. However, it should be pointed out that the effectiveness of such a teaching program is not necessarily a function of the time assigned. A properly planned and integrated course of 12 hours may be far

superior to one of 24 hours if the latter is a product of inferior planning and unbalanced in presentation. Certain of the factors entering into this situation will be discussed later.

Technique of Instruction

THE method of instruction in these 25 schools is almost entirely confined to lectures and field work, the latter designating visits to plant medical departments, industrial health centers, government bureaus of industrial hygiene and workmen's compensation proceedings, according to circumstances. Time does not appear to permit of laboratory studies in an undergraduate course. The replacing of lectures by the seminar and conference technique, while presenting numerous advantages, has not as yet been adopted in any of the schools under consideration. There are many administrative and financial problems involved in the splitting up of large classes into smaller groups, even though it is realized that such is the desirable objective. The teaching personnel factor is the chief difficulty.

TABLE 2.
INDUSTRIAL MEDICINE—25 MEDICAL COLLEGES
FIELD INSTRUCTION

	No.	%
Field work included	11	44
Field work not included	14	56

Table 2 presents data on the number of schools utilizing field work for instruction. Eleven, or 44%, include field visits while 14, or 56%, do not use this technique. The extreme fluctuations in teaching practice are exemplified by the following: the schools listing field work vary from 20 to 100% in the number of hours assigned to field work; one school giving no didactic periods. Another offers 87% of the course in field work, inclusive of clinical periods, with only two formal lectures, while a third prescribes 66 2/3% for field activities.

The importance of field work would appear to require no emphasis as it applies to visits to industrial medical departments, governmental industrial health agencies, workmen's compensation boards, and so on. However, the mere fact of inclusion of field activity in the curriculum offers no assurance of its instructional value. If field trips are to be effective, they must be conducted with small groups of students, say six to eight. Careful preliminary planning and excellent organization are vital to produce good results. The industry selected should offer adequate teaching material. Ordinarily, a representative of the medical school teaching staff should be on hand to be certain that students do not get bogged down in a mass of technical detail. This is greatly facilitated when the faculty member conducting the course is the medical director of a large industry.

Title of the Department Teaching Industrial Medicine

TITLES are obviously of secondary importance compared with the conduct and quality of the teaching. However, titles do indicate the trend of faculty thinking.

TABLE 3.

Department	No.	%
Bacteriology	1	4
Medicine	2	8
Separate	3	12
Public Health	19	76

It will be noted that the teaching falls under the Department of Bacteriology in one school, under the Department of Medicine in two, under the Dean as separate departments in three and under the Department of Preventive Medicine and Public Health, or a corresponding combined unit in 19.

Yale University and the University of Pittsburgh have separate Departments. The University of Colorado has a large Division of Industrial Hygiene under the Chief of Medicine. While not technically a Department, is actually functions as such and is so considered in Table 3.

Of the 19 schools administering instruction under a Department of Preventive Medicine and Public Health or a corresponding Division, Jefferson Medical College and New York University have a full-time Section of Industrial Medicine, and Columbia University has a full-time Division in the School of Public Health. The University of Michigan has adopted a similar plan, in the School of Public Health, although not yet in operation. These two Schools of Public Health are utilized for undergraduate instruction. The trend of industrial medical curricula to be administered by Departments of Preventive Medicine and Public Health is therefore marked.

Separate Curriculum

FIVE schools present courses under the full-time direction of a specialist, ranging from 15 to 24 hours and nine under part-time direction, ranging from six to 33 hours, the latter being medical directors in industry or chiefs of industrial hygiene bureaus. The remaining 11 schools offer instruction under non-specialists, ranging from one or two to 14 hours.

TABLE 4.
INDUSTRIAL MEDICINE—25 MEDICAL COLLEGES
DIRECTION OF TEACHING

	No.	%
Specialist: full-time	5	20
Specialist: part-time	9	36
Non-specialist	11	44

The academic rank of these full-time and part-time specialists is of interest as reflecting faculty recognition of the subject. A tabulation for 11 schools follows:

Title	Number of Schools
Professor of Industrial Medicine	2
Ass't. Prof. of Industrial Medicine	2
Professor of Industrial Hygiene	2
Ass't. Prof. of Industrial Hygiene	1
Assoc. Prof. of Industrial and Preventive Medicine	1
Associate Prof. of Medicine	1
Ass't. Prof. of Bact. & Prev. Medicine	1
Lecturer (Preventive Medicine)	1

The academic rank varies from lecturer to full professor—in fact, there is only one with status of lecturer, the remainder being in the ranks of full, associate and assistant professor designated as in industrial medicine, hygiene, industrial and preventive medicine combined, bacteriology and preventive medicine combined, and in medicine.

Types of Curriculum

AS TO types of curriculum, the headings in Table 5 call for definition. It will be noted that 11 schools offer a course designated as "Integrated." This term

TABLE 5.
INDUSTRIAL MEDICINE—28 MEDICAL COLLEGES
TYPES OF CURRICULUM

	No.	%
Integrated scope	11	40
Restricted scope	6	21
Few topics	8	28
None	3	11

indicates that an attempt is made to cover most of the main aspects of the subject with an allowance of sufficient time. The number of clock hours in this group varies from 10 to 33 hours. However, the coverage is by no means complete in all instances, and the relative weightings of subject matter ill-advised in some instances. The term "Restricted in Scope" signifies that certain important topics are not presented, the course being out of balance. In five of these schools the time allowance ranges from eight to 16 hours. Another school allows 24 hours of instruction but the schedule is given over almost exclusively to industrial hygiene and occupational diseases with practically no weighting included for medical administration and the over-all responsibilities of the industrial physician.

Under the category "Limited to Few Topics" the instruction is merged with that of the Department of Preventive Medicine with no unified organization of the material, the time allotted varying from two to six hours in seven schools and listed as 10 hours in one additional institution.

The evaluation of teaching programs thus far in this survey has emphasized the enormously wide variation in the recognition of industrial medicine as an integral part of undergraduate education, ranging all the way from complete indifference through various gradations up to adequate presentation. It will be the function ultimately of the Council on Industrial Health and the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS jointly to recommend a curricular pattern which will be reasonably standard and practicable. There are just so many hours in the medical school curriculum as a whole. It will, therefore, remain to be determined, first, what is the minimum proportion of time to be allotted to the subject consistent with adequate coverage; second, the precise subject matter to be included; and, third, the proper weighting of components.

Recent Plans and Developments

RECENT important plans and developments in the fields of education and research in industrial medicine call for brief mention, in view of their expected impact on the acceleration of interest in undergraduate indoctrination and training.

The Jefferson Medical College has recently set up an industrial medical division under full-time direction in the Department of Preventive Medicine. Georgetown University, with no program at present, is considering the adoption of a course. Yale University plans to expand undergraduate teaching in the next academic year. Colorado University contemplates extending the curriculum for undergraduates.

The following three schools within the last few months have established curricula under specialistic direction: Indiana, Louisville and Marquette Universities.

The Institute of Occupational Medicine, the first of its kind, was recently inaugurated at the Yale University Medical School and is organized as an independent Department. A Department of Industrial Medicine has been approved and financed for the School of Public Health of the University of Michigan. The Wayne University School of Occupational Health is a unique development and, although a post-graduate institution, should tend to focus attention on the need for improved undergraduate teaching.

The University of Chicago is planning for an Institute of Industrial Medicine for training and research, although this has not yet reached the blueprint stage. An analogous situation holds for New York University. The Long Island Medical College has formulated plans for an Industrial Health Unit or Institute and is awaiting financial aid to set these plans in operation. The University of Illinois has all plans approved for organizing an Institute of Industrial Medicine in Chicago and similarly is awaiting financial backing.

The proposed Residency in Occupational Medicine, now under consideration by the Council on Medical Education of the AMA, when approved, will give added impetus to universal acceptance of the subject and the establishing of criteria in undergraduate teaching.

As a tentative conclusion, I believe I am justified in the statement that industrial medicine is receiving increased emphasis at the undergraduate level, and that the prospects for adequate general acceptance in the medical school curriculum are encouraging.

Discussion

DR. RONALD F. BUCHAN (Yale University): At New Haven, we are just five months young with our Institute of Occupational Medicine and Hygiene. We have been concerned, as would be anyone in such a situation, with many organizational problems.

We conceive our responsibilities at the moment to involve the practice, teaching and research in the fields of occupational medicine and hygiene, and with those responsibilities a certain amount of time must be devoted to undergraduate teaching. I think it will be apparent that with the larger field of responsibilities we must of necessity divide our efforts and attention between the undergraduate field and the responsibilities of the graduate field, and what we feel to be an integral part of the whole program, the practice of industrial medicine in the community and as associated with the teaching center as means of demonstration and teaching for medical students, interns, and residents. Further, I think it is apparent that administrational problems will somewhat dictate, at least in the beginning, the method and the departments in which we may give instruction in occupational medicine and hygiene.

The universities that embark upon this work are cognizant of the importance and needs of the field of occupational medicine and hygiene but, as I pointed out, we are young in it, too. We must move soundly and cautiously. What we do initiate we must be sure will make a solid contribution to the whole concept of practice, teaching and research in the whole field.

I think I can, probably, by telling you what we are doing in New Haven, give some indication of what at this moment, five months young, we feel we can do in undergraduate teaching.

Let me say that up until the time of the inception of the Institute of Occupational Medicine and Hygiene, undergraduate teaching had been given to the amount of six required hours in the course on preventive medicine and public health; and to the amount of 12 elective hours in pharmacology, in which a seminar on industrial toxicology, as it was called for a number of years, was given, but which was essentially a teaching program of seminar nature, elective for fourth-year medical students.

We haven't thrown those aside. We have made what use we can of them, implementing as we can. During this past year we coninued six required hours in the course of preventive medicine and public health. That was implemented by admitting—while this discussion is limited to undergraduate instruction, I shall have to mention this—graduate students and practicing industrial physicians full- and part-time in the New England area.

We hope next year, and our plans are pretty well formulated at this time, to start formal instruction in industrial medicine, starting in the second year of medical instruction in the course on physical diagnosis. We now intend to allocate three required hours out of that course to instruction in proper taking of occupational history, with emphasis upon its importance and the proper method of elicitation of significant facts in regard to it, and also instruction and demonstration in the recognition and significance of occupational stigmata.

Further we hope to introduce two required hours—when I say we hope to, that is our plan, and until some act of God so prevents, that is what we shall do in the next academic year—in the course in pharmacology, in which particular emphasis will be given to the industrial factors as applied to toxicological problems.

In the third year we intend to have a 12-week, two hours a week, that is 24 hours, required course on the principles and practice of industrial medicine.

At Yale, the bulk of teaching, once past the pre-clinical sciences, is on an elective basis. The total annual enrollment in the medical school being 50, the groups in the elective courses vary from 5 to 20. It may be that we can include the whole enrollment of 50 for that 24-hour required course. We are not sure of that yet. That is what we would like to do. We may have to limit it to approximately half the class.

In the fourth year we will have another 24-hour elective course on advanced industrial medicine. That particular course may be the same as the one we have had this past year, the method of administration being admission of qualified fourth-year students to the post-graduate course which is given for the practicing industrial physicians in the New England area.

Further, in the fourth year—in which specialties are taught at Yale—we intend in each specialty to give two hours' instruction in the clinics and on the wards in each specialized field, with particular emphasis on the industrial factors as they apply to that specialty.

Now, industrial medicine has been called a specialty of specialties, and from an administrative point of view and from what seems to us like a practical point of view, we feel that we can introduce in the existing departments of specialty teaching the proper emphasis on these industrial subjects, providing it is planned as DR. BROWN has pointed out—it must be planned and it must be correlated.

We are in position to do that, our Institute being a separate institute superimposed upon the already existent fiber of the University.

We started this year and will continue, and we hope supplement next year, teaching and instruction for the interns and residents in the New Haven Hospital and the Grace Hospital, the two being the teaching units of Yale, in which we will give them, as we did this year, an overall concept of the field of industrial practice; and on broad grounds, and at selected occasions during the didactic training given to interns and residents, discussion and presentation of cases of an occupational nature.

There is one thing that I didn't mention in regard to the four-year students which is most important. We have our provisions just about complete for permitting the fourth-year medical students to have a period of service in industry in Connecticut in which they will do the work in the industrial dispensary or health unit, much as they get their clinical experience in the other specialties within the clinics and wards of the hospitals.

DR. BROWN has pointed out that the components of the curriculum are important entities, and indeed they are. We are not at the point yet where we have established a definite curriculum carrying through the four years on the intern and resident program, feeling that as young as we are we should like to observe the effects and results of the efforts I have just outlined. We are in position so that if our efforts are fruitful, we can, without any great difficulty, add the additional factors which are necessary to complete and integrate the entire program.

Also in addition to the clinical and practical ward work, the didactic instruction—of which there is very little at Yale, much of it being demonstration on an individual basis—includes giving the necessary technical instruction, and demonstration and field trips and technical aspects, particularly as related to the chemical and engineering methods, field sample technics and laboratory methods necessary to achieve such ends.

That at this moment is the content of our teaching for undergraduate students. We feel that it is a considerable addition to what has previously been a total of six hours. As I pointed out, we have, further, the additional problems of meeting graduate instruction for physicians, nurses, engineers, and chemists. I think it is apparent and understandable that we must allocate the time and facilities and staff that we have as favorably as we can among those various responsibilities.

DR. RAYMOND HUSSEY (Dean, School of Occupational Health, Wayne University, Detroit): Occupational or industrial medicine will progress as medicine as a whole progresses. The fundamental principles which guide these activities are the same, but in the practice of occupational medicine there are many details of practical management which must be adapted to the peculiarities of each particular office or factory installation. Also, in offices and factories there are factors of etiology peculiar to those particular environments. It is in respect of these conditions, as well as others, that occupational medicine may represent a specialized field.

Until now health has been considered largely from the point of view of the absence of demonstrable disease. In this manner the study of disease has been the central objective of medicine. In the future, medicine must also recognize the subject of health as a proper major professional concern. Medicine must expand the application of its energy to the development of the principles and skills required to establish a concept of health in a manner that we have so successfully succeeded in developing the concept of disease and skills for diagnosis. It is not suggested that the interest of medicine in disease should be diverted into other channels, but merely that medicine recognize new channels for exploration. If achievement is to be attained in the field of occupational health, positive action must be exerted to carry out these recommendations.

The occupational situation as a special segment of a community offers unusual, indeed unique, opportunities for establishing a basis and developing an approach to a positive and constructive program for the study and practice of preventive medicine in the field of health.

Progress in medicine has depended chiefly on a knowledge of the facts of etiology and physiology with their ramifications and subdivisions. Achievement in health promotion and maintenance will be dependent upon the understanding, the elimination, or effective control of etiological factors inimical to health. Accomplishment in this field has been and will be the result of cooperation and collaboration of physicians with representatives of many applied sciences. We are now well acquainted with a variety of chemical and physical agents encountered in the work environment, and we are aware of how successfully many of these factors may be controlled. However, there is great need to broaden our concept of etiology in relation to both health and disease. For example, we have learned to appreciate the significant role played by social, personal and emotional factors in determining "occupational fitness" and "work capacity." The expressions "human factors" and "human relations" have become established terminology to include the study of these etiological factors in relation to their influence on the prevention of accidents and disease on the job, the adaptation of individuals to jobs and fellow workers, as well as the adjustment of jobs to the people.

Nearly all patients are engaged in some occupation. Information is incomplete regarding the influence of occupation on health and disease; however, in recent years we have acquired a great deal of knowledge about the various occupations with reference to physical and physiological demands. Also, we are gradually accumulating information about the reaction of man to various jobs and work environments. It follows from this, I believe, that the problem of outstanding importance in developing an educational program in the field of occupational health and medicine is to offer instruction in the undergraduate medical curriculum.

I believe we would do well to consider what every physician should know about occupations and proceed from this point to the consideration of what should be offered for graduate, post-graduate and continuation programs. I believe the program for these three activities offers no serious problem with reference to content, although considerable experience is needed to work out details with reference to the period of time required of one to attain competence

in one or other division of occupational health and medicine. At the moment our principal concern has to do with physicians.

A pressing educational need at the moment is the inclusion of occupational health and medicine in the teaching of undergraduate medical students. The principal aim in developing undergraduate medical instruction should be directed toward teaching fundamental principles with opportunities for experience with concrete examples which should fasten these principles and their limitations in the minds of students for future guidance in evaluating and solving problems that arise.

It is my considered opinion that the approach to this accomplishment be attempted by the method of *infiltration*. By infiltration into and integration of courses in the preclinical curriculum, an effort should be made to develop the presentation of health as a positive concept. Similarly a great deal more could be done in developing knowledge of etiology and applied physiology.

Opportunities for instruction in the structural and functional organization of the community should be offered, and the place that occupation holds in the social and economic activities of the community should be emphasized. This subject cuts horizontally across the fields of the natural and social sciences.

Greater emphasis should be given in teaching the techniques of obtaining social and occupational histories, together with a consideration of the broad implications and the proper utilization of this knowledge as a natural and important part of clinical discussion. These subjects have been neglected.

In teaching the techniques and demonstrating the objectives of physical examination, emphasis should be placed on determining occupational fitness and work capacity. Sufficient progress has been made in the procedures for individual health evaluation to warrant a discussion of this activity in emphasizing the objectives of *medical examination*.

As a part of the out-patient service activities, time should be allotted to students for clinical training in a properly qualified medical department in a business or factory. It is important that some arrangement be made for the student to gain first-hand knowledge of the sources of etiology, of job requirements, and of the impersonal relationships of people on the job. The student must have experience with the total work environment. Unless this is done, the problem of teaching occupational health and medicine will be somewhat analogous to the teaching of tropical medicine as it has been attempted in the past.

If occupational medicine is properly represented on hospital staffs, graduates of medicine could continue as interns to develop their knowledge regarding the relationship of occupation to health and disease. In this manner young practitioners will be in a better position to render medical service to industry.

The correctness of the point of view expressed gains force when one considers that 85% or more of all employed individuals are connected with concerns which depend upon private practitioners for their medical work; and, moreover, practically every patient a physician has is an employee connected with some occupational pursuit.

The real problems of developing graduate education in the field of occupational health and medicine are concerned (1) with developing enduring foundations in research and service, (2) with demand for graduate education which will depend in large part upon management in recognizing the distinctive professional qualifications required of physicians to practice in the field of occupational health and medicine, and (3) with the establishment of the positions and opportunities of importance commensurate with the educational and training requirements in order to attract young physicians to this field of practice as a career.

In Detroit the plans for an Institute for the development of research and service in the field of occupational health and medicine were announced during the latter part of 1944. This program included graduate educational opportunities. Although the Institute has not yet been established, the educational program has been translated into preliminary action.

Three groups of conferences, 10 in each group, were presented during autumn of 1945, and the winter and spring of 1946. The first group covered the subject of "Human Relations in Industry"; the second included a variety of subjects dealing with the medical aspects of employment problems; and the third dealt with technical subjects of medical-engineering-chemical interest concerning hygiene and toxicology.

During the autumn of 1946 an intensive 15-week systematic and integrated course was offered including the subjects of occupational health, preventive occupational medicine, clinical occupational medicine and administrative medicine. We believe we have established a pattern of procedure which, with some modification based on experience, will meet the educational needs for instruction in occupational health and medicine.

DR. T. LYLE HAZLETT (Director, Department of Industrial Medicine, University of Pittsburgh): A number of years ago at a meeting of the Association of Medical Schools, a very able professor of preventive medicine in one of our leading medical schools arose after a short presentation on industrial medicine and said that it was a crime to expose all students to a course in industrial medicine, but rather that it should be elective, with only those interested compelled to attend. In Pittsburgh for the past 10 years, we have felt that all students should have the exposure, for, from a survey we made on recent graduates, 80% were found to have some industrial contacts in the first five years of their careers.

As early as 1922, the late Dr. Huggins, then Dean of our medical school, felt that emphasis should be placed on industrial medical problems in our medical school because of our highly industrialized community. From that time until 1936 some lectures were given by the Department of Preventive Medicine. Then Dr. Huggins felt that further steps should be taken to give our students more instruction in this field, and at this time a separate Department of Industrial Hygiene was established with 14 hours in the senior year devoted to the subject. Since then the hours have been extended to 22, which carry through two trimesters in our school year.

In the first few years, plant visits were included. Owing to the fact that time for plant visits was difficult to fit in with the other work, and also because there was a question of how much benefit was gained by the students from these visits, they were discontinued at the beginning of the war period. In their place a specially-prepared film is shown which depicts the usual industrial exposures and the preventive measures. This film is presented at the beginning of the course, and, to those students who never have been within an industrial plant, it presents a birdseye view of some of our problems. We have felt that it fits into our general scheme better than individual plant visits.

Lectures of one hour are given each week. All of the lectures are by men who are actively engaged in their respective fields. It has been our practice to present to each student a copy of each lecture.

Clinical material has not been featured as much as we should like, but we hope to be able to do this in the future. However, the students do see individual cases in general medicine from time to time.

This course in industrial medicine should be presented in the senior year, since the students receive other specialty courses during this time; also, they are more prepared to see the extent of the field and its opportunities, not only from a clinical but also from a research standpoint.

Such a series of lectures must of necessity be an orientation in the field, and this point should be kept in mind. An examination is given, and it is most enlightening to read the answers, largely to general questions. However, the students have learned that it takes certain exposures to cause trouble; hence, they are not likely to make a diagnosis of copper poisoning simply because the individual worked in a copper foundry, as an example of what has occurred in the past. It has been gratifying to receive calls from our former students, practicing perhaps in mining towns or small factories, requesting advice on a particular problem; also, to know that many of them have the lectures on file for reference.

Faculty and students of the First Graduate Course in Industrial Medicine given at the School of Medicine, University of Pittsburgh, October 24-28, 1938

We feel that such a course must be an entity in the medical school curriculum, and that it should receive recognition as a separate department if it is to attract the interest of the student. Also, it should receive financial support not only from the medical school itself, but also from industry within the community.

DR. ROBERT A. KEHOE (Kettering Laboratory, Cincinnati): I have listened with a great deal of interest to this symposium. I recognize that many of us at the present time have very significant reasons for being keenly interested in this problem. There is just one point that I would like to make. It is the only thing I can contribute that is in any way a variation of this theme, which I think has been adequately discussed. It is something that requires serious consideration. By and large, the industrial revolution, if I may call it that, has brought into the modern community very serious environmental changes. A large portion of the population at the present time is employed in a very complicated, very busy industrial environment.

There are, therefore, two problems that require careful attention. One is the problem of the make-up of the industrial environment with its physical and chemical characteristics—an increasingly complicated scene. I think it is fair to say, and I speak as a physician, that the physician does not understand that scene; that none of us understands it; and that the physician does not have the tools at his command and the technics and disciplines with which to acquire complete understanding of it.

Then there is the second problem, the impact of this environment upon the human organism; and I am very certain that none of us, as physiologists or medical men or any other branch of practice, completely understands this.

Numerous things are involved in the modern community that represent serious problems to us at the present time. Let me mention one: The problem of aging in an increasingly old population. How much do we know about it? How much do we understand it? How much of it is the product of the change in the modern environment? I don't know. I don't think anyone does. Some of us have ideas about it, or at least are thinking about its investigation. There we have the problem of a very greatly changed environment, which we do not fully understand; the problem of its impact on the human organism, which we certainly do not understand. That makes the need for a serious and careful investigative approach.

It means also, since the organized methods of teaching are crystallized into the medical curriculum and into the engineering curriculum, that we have two fields of research which must move along simultaneously.

One of the things with which we are all familiar is that organized activities in human life do tend to crystallize; they tend to lose their functional relationship to the changing scene. We have a very formalized medical education on the one hand, and a formal engineering education on the other, and they are separate. In order to invade this field properly, and it will have to be invaded, we shall have to influence both engineering training and medical training, and bring out in some fashion a working team in which the sciences that are capable of studying the problem of the environment, and the group in medicine who are concerned with studying the impact of that environment on man, can be brought together, not only in the coordination of their day's work, but also in the coordination of their investigation and their training.

I therefore raise this very practical question, which arises out of this discussion: Where and how do we bring together for the training that is needed in this field the engineering group—if I may speak of that group as representing physics and chemistry, essentially—on the one hand, and the medical group on the other, so that we shall secure out of it either the individual well trained or the team well trained to coordinate their activities so that we shall know more about this problem and be able to do more about it? That, I think, is one of the significant problems of education in this field.

Nitric Acid Fume Pneumonia

—A Case Report—

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THERE are many noxious fumes which on inhalation will produce the clinical picture of acute pulmonary edema, followed by either a rapid resolution or a fatal termination resulting from right heart failure, bronchopneumonia, or a fibrosis of pulmonary tissue. One of these is nitric acid, the causative agent in this case.

Case Report

A. Z., white, male, aged 58, entered St. Marys of Nazareth Hospital on July 25, 1946, because of severe respiratory distress of eight hours' duration. At the time of admission, he was engaged by a plating firm to work the bright dip. The firm had just moved into new quarters and no ventilation had been installed. On the morning of admission, he had made a mistake and dipped the wrong metal into the vat of nitric acid causing an escape of nitric acid fumes. He wore no mask and stayed in the room "five to 10 minutes." Afterwards, he worked for an hour and then experienced a headache and fatigue. He went home and gradually became more and more dyspneic and was brought to the hospital at 7:00 P.M., 10 hours after the inhalation of the fumes.

The patient was well oriented but was acutely ill, with moderate cyanosis and severe respiratory distress. The temperature was 97°, pulse rate 110, and respiratory rate 60 per minute. The blood pressure was 110/70. The chest expanded equally bilaterally. The percussion note was resonant throughout. Moist rales were heard throughout both lung fields. The heart was not enlarged and its sounds were loud and of good quality. Further physical examination was negative.

The patient was given oxygen per nasal catheters, complete bed rest in a semi-sitting position, 20 cc. of aminophyllin intravenous, atropine, and penicillin. Blood count revealed 5,200,000 red cells with 110% hemoglobin, and 21,000 white cells with 90% polymorphonuclear leucocytes. The urine and blood chemistry were normal.

By 8:00 P.M., the blood pressure dropped to 72/60, the pulse was 92, and the respirations were 48. At 10:30 P.M. sedation was given and the patient slept the entire night. For the next four days, the patient was in a tent with 40% concentration of oxygen, free of cyanosis and subjective complaints.

By the fourth day, in spite of the penicillin, he had a septic rise in temperature to 104.6°. Additional treatment during this time consisted of a high caloric diet, vitamin C, liver and iron.

The initial roentgenogram (Fig. 1) taken 12 hours after admission showed evidences of bronchopneumonic consolidation, nodular and dense configurations involving the lower lung fields more than the upper and the right more than the left.

Further roentgenograms taken every 12 hours showed a marked gradual improvement.

On the fifth morning, the patient complained of pain for the first time. This was located in the right midclavicular line at the level of the fourth rib, which correlated with a roentgenogram (Fig. 2) showing a beginning pleurisy and effusion.

By the seventh day, temperature, pulse, respiration and blood pressure were normal, and the patient was out of the oxygen three hours in the morning and afternoon. The white count, however, was 14,000 with 78% polymorphonuclear cells. Medication continued.

On the eighth day, the patient once more complained of dyspnea and was kept in the tent continuously. The roentgenogram again revealed a bronchopneumonic infiltration and a tendency toward coelescing of the bronchopneumonic patches spreading bilaterally into both upper and lower lobes. Temperature began fluctuating between 99° and 102°, pulse between 84 and 92, and respirations between 20 and 28.

By the fourteenth day, he became desperately ill and was deeply cyanotic under oxygen tent and nasal oxygen. A positive pressure oxygen mask was applied, giving him a concentration of 95% oxygen at 15 liters per minute. This immediately relieved his cyanosis and he began to feel better.

Cardiac consultation suggested a phlebotomy and 500 cc. whole blood were withdrawn. This caused increased distress and 300 cc. of fresh whole blood were readministered. The penicillin dosage by this time was 100,000 units every four hours, augmented by sulfadiazene therapy. Streptomycin was suggested, but was unobtainable.

From the fifteenth to the eighteenth day, despite all medication and positive pressure oxygen, the patient progressed into a semi-comatose condition and, on the eighteenth day, with a pulse rate of 110, respiration of 50 (Fig. 3) and a temperature of 98°, he quietly expired.

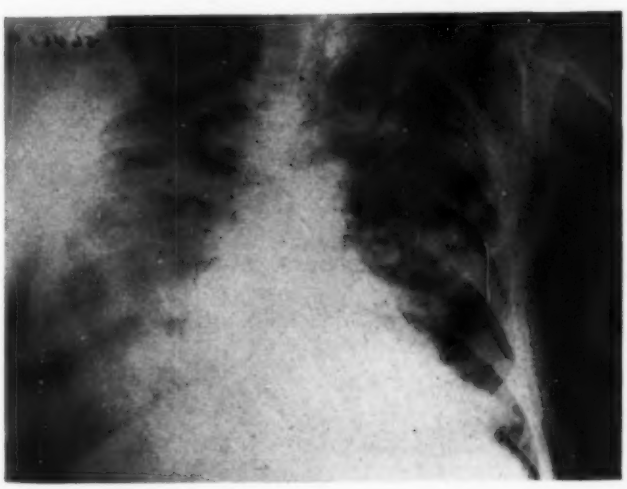

Fig. 1.

Fig. 2.

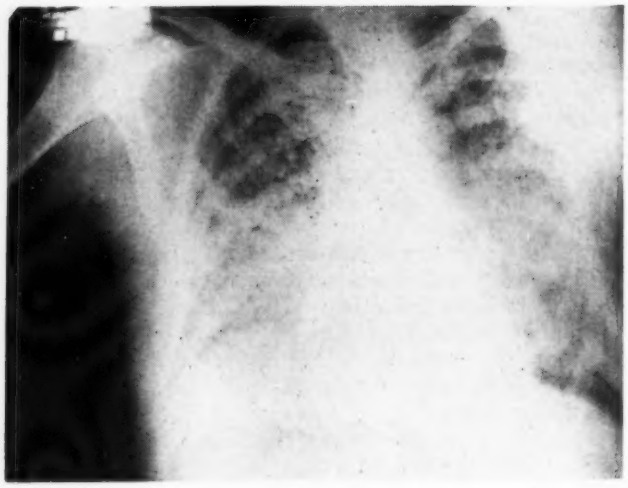

Fig. 3.

Fig. 4.

A postmortem examination one and one-half hours after death revealed the following pulmonary pathology.

GROSS: The pleural cavity was completely dry and there were no adhesions between the visceral and parietal pleura. The lungs were enlarged and filled the entire chest cavity. The surface of the lung was a mottled black and purplish, while at the periphery, over-aerated lung could be seen (Fig. 4). On palpation, numerous nodules 2 to 10 millimeters in size were felt throughout both lungs. Cut section revealed a greyish purple surface with protruding firm nodules, greyish white in color, scattered throughout (Fig. 5).

MICROSCOPIC: The alveoli could barely be distinguished in most areas and were filled with an exudate composed of polymorphonuclear cells, lymphocytes, macrophages, eosinophils, and infiltrating fibroblasts (Fig. 6).

COMMENT: The history, physical signs and symptoms, and laboratory and x-ray findings made the diagnosis of "nitric acid fume pneumonia."

Prophylactic Treatment

CAREFUL industrial precautions, in the form of masks and exhaust systems installed in every possible occupation in which nitric acid fumes may appear, are the greatest factors in saving lives.

Active Treatment

THE advocated early treatment in controlling the acute pulmonary edema consists of oxygen and diuretics (mercurials and hypertonic sucrose). Once the edema is controlled, two serious complications may occur.

The first, bronchopneumonia, is treated with penicillin and sulfa drugs, and was controlled in this case. Streptomycin may also be used.

The second, right heart failure, which may ensue in a matter of hour with or after the acute pulmonary edema, may be controlled by phlebotomy, augmented with digitalis and aminophyllin.

If these two conditions are controlled, as will be the case in an increasing number of patients, then in two to three weeks pulmonary "fibrosis" may be seen. It is difficult to stand by giving the patient more and more oxygen through nasal catheters, oxygen tent, and finally, 95% concentration under positive pressure through a mask, and watch the gradual loss of pulmonary tissue mirrored in the increased dyspnea and cyanosis. We believe that the final outcome will depend on the concentration of the fumes and the duration of the exposure. With the acute pulmonary edema, cardiac failure, and bronchopneumonia controlled, we have yet to devise a method of treatment to prevent or control the pulmonary "fibrosis."

Conclusion

A CASE of "nitric acid fume pneumonia" was presented, with the postmortem findings.

2. The prognosis depends directly upon concentration of fumes and duration of exposure.

3. Fatal termination resulted because of the pulmonary "fibrosis" after control of pulmonary edema, cardiac failure, and bronchopneumonia was attained.

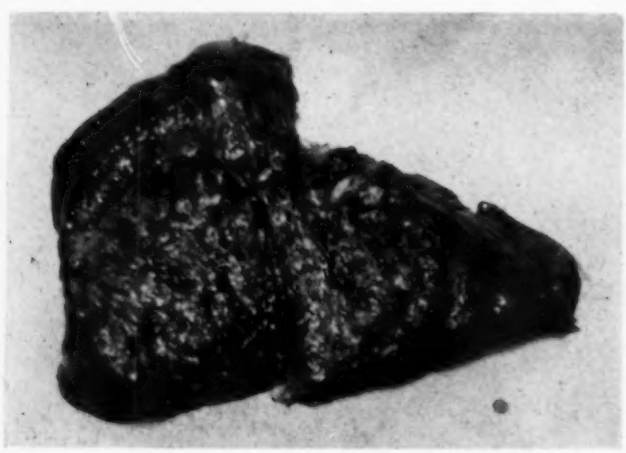

Fig. 5.

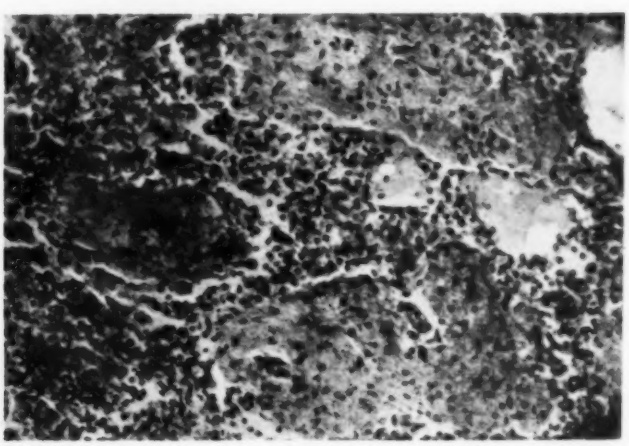

Fig. 6.

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Medical Aspects of Industrial Safety

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THIS is not going to be an involved dissertation on the relationships of medicine to safety. Instead, I am going to discuss one of the greatest barriers to the successful operation of any safety program, namely, the single, unilateral method of attack on safety problems.

By this, I mean the attempt, usually unsuccessful, of any one individual to solve all company problems by himself.

It isn't that simple!

Occasionally, we find some safety engineers, fortunately few, who resent the interest and activity shown by others in safety problems. These engineers feel that safety is their own particular baby and they want no interference or advice. At the other extreme, we find certain industrial physicians who are only slightly, if at all, interested in safety; who give it but a passing thought, and who relegate it directly and completely to the company safety engineer. We see foremen and supervisors who believe that the safety engineer is solely responsible for the safe operation of every department in the plant. We see company executives who, having salved their consciences by hiring a safety engineer, promptly proceed to forget all about him, giving him no cooperation, no backing, and, worst of all, no operating funds. But real safety control involves more than belt-guards or goggles or safety shoes. It requires much more than the mere posting of caution signs around the factory.

I want to bring out into the open the fact that safety and the solution of safety problems is not the job of any one man. A real safety program requires not only the services of the safety engineer, but also the assistance and cooperation of the plant physician, the employment manager, the plant engineer and others, as well as the complete backing of top management itself. No single one of these agents can solve the plant safety problem alone. It requires consultation, coordination, and mutual assistance to work out and to maintain a system of safety control that will do the job properly.

During the later war years, we at Sharp & Dohme were not particularly proud of our safety record. In 1943, for example, the accident frequency rate for our main plant was 14.8. In 1944, it rose to 21.8, and in 1945, to 23.7. This, in spite of the fact that we had a functioning safety department and an earnest and capable safety engineer. Obviously, then, there existed causative factors which were not and could not be directly influenced by our safety engineer. The problem then resolved itself into a study of the basic causes of these accidents, and, this having been determined, the creation of an efficient control program for their prevention.

Statistical analyses of accident causes are, of course, familiar to all of you. You know that substantially less than 20% of all industrial accidents are caused by purely mechanical factors. These include the hazardous arrangement of machinery, poorly planned operations and procedures, poor housekeeping, improper guarding, defective equipment, and unsafe dress of employees, particularly women.

With this type of problem, every good safety engineer can cope. He has the mechanical and engineering background, the practical know-how to handle these hazards. However, even after he has corrected every mechanical hazard in the plant, he has still prevented less than 20% of his industrial accidents.

The average safety engineer then runs into the situation, faced no doubt by many of you safety men today, where excellent safety control procedures have been set up, yet where accidents of all sorts continue to occur. Clerks puncture their fingers with pencils, individuals trip over their own feet and crack their skulls, people walk into desks—one thing happens after another—and against none of these things can the safety engineer provide adequate protection. After a few months of this, our average safety engineer is strongly tempted to throw up his hands in disgust, and to stop beating his head against a stone wall. There, in many organizations, the matter rests—the safety engineer at a dead end—and the accidents going merrily along.

Does that strike home with some of you? It struck home with us. In spite of the hard work and excellent recommendations of our safety engineer, our frequency rate was becoming worse each year. The obvious answer, of course, was the consideration of control measures to prevent the 80% of accidents which were of personal rather than mechanical or environmental origin.

I am not going to discuss in great detail the personal causes of accidents. Briefly, they may be broadly divided into three general categories, of which the first, and perhaps, most important, is improper attitude.

The term "improper attitude" covers a multitude of sins. It includes the unhappy worker, the chap burdened down with private worries and cares. It includes the careless worker, and the inattentive worker, who is more interested in the daily racing form than he is in his job. It includes the disgruntled and rebellious worker, who is resentful of supervision, and jealous of the promotion and success of others. It includes the rugged individualist, who stubbornly does things his own way, safety rules notwithstanding. It includes the occasional practical joker—the dissatisfied worker, who feels that he is poorly paid or that he works too hard, or who is displeased with the plant sanitary facilities, or, perhaps, with the color of the work clothes. Statistically, it has been shown that these individuals are far more likely to have accidents than those who are contented in their jobs and happy in their surroundings, and who have a high level of company morale.

The second large group includes those individuals who have accidents because of insufficient skill or lack of knowledge. This is of particular importance among new employees, where instruction concerning the new job may be inadequate or incomplete, or where it may consist simply of a few words of direction and a pat on the back.

Fortunately, the general trend in industry today is toward careful and thorough training of the fledgling worker, and, with careful supervision and assistance, this cause of accidents is being materially decreased.

Accidents in the third large group include those

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caused by physical and mental defects. The hazards involved in the presence of certain physical defects have been recognized for many years. Only recently, however, has it been recognized that certain psychological and temperamental characteristics of the individual have a definite bearing on his efficiency and his tendency toward unsafe actions.

Let me make brief mention, in passing, of the so-called "accident-prone individual" in industry. In the past, many safety engineers have tended to regard accidents as a matter of chance, something like being struck by lightning. Actually, statistics indicate that accidents are not distributed by chance, but are unduly frequent in some individuals and infrequent in others. Owing, perhaps to some inherent psychophysiological predisposition, such as a slow reaction-time, or a subnormal degree of mental alertness, or possibly because of a temporary change in outlook or attitude, these people have more accidents.

Psychological appraisal and a careful medical history and physical examination will frequently indicate, to the examining physician, that a prospective employee is accident-prone, or, to be more specific, an accident-repeater. Due judgment may then be exercised in the placement of such an individual.

Coming back to our own immediate problem at Sharp & Dohme, both the safety engineer and I felt that our poor rates were the result of a failure of coordination of our efforts. We likened our situation to a group of men trying one at a time to break down a locked door. Individually, it defied their efforts, but when several of them struck it at once, it broke open easily. Once this was acknowledged, the next step was clear. We sat down together, and we planned together. We conferred with the employment manager, the training supervisor, the chief engineer, various division directors, foremen—anyone and everyone who had something to offer.

We went over our records system—our procedures—we planned new ways of publicizing safety. We planned our campaign to make every man a safety man—and, most important of all, we planned the return of the actual responsibility for safety right where it belonged back in the individual department, directly in the hands of the department manager or supervisor.

On the first of March, in 1946, with little or no fanfare, we put into effect a new overall medical-safety program.

In the medical department, our first step was to make more elastic our procedure in administering the entrance physical examination. We no longer adhered to a fixed set of standards for physical qualifications of a potential employee. Instead, we considered him in the light of the job for which he was applying. By tempering our knowledge of job requirements with a little common sense, we found that many individuals with handicaps that previously would have barred them from employment, could now be placed in jobs where their handicap was of little or no significance.

Under the new procedure, we satisfied ourselves that the individual was able to fill the job safely and efficiently. This, of course, required that each applicant be treated as an individual, not merely as a number, or as a small cog in a large wheel. It involved an appraisal, not only of his physical capacities, but also of his mental ability, temperament, and personality. In other words, we did what we could to fit a round peg into a round hole.

While this procedure added to the burden on the medical department, this custom-tailoring of individuals to particular jobs paid off in dividends of better production, fewer accidents, and improved employee morale.

Our routine, up to this point, still included one large defect that needed correction. In our plants, we follow the procedure of promoting from within, wherever possible. As a result, we had employees originally hired for one job, subsequently promoted to another, with different, and often more demanding, physical requirements. Under the old system, promotions were made directly through personnel, with no reference to the medical department. In order to prevent the misplacement of personnel, a system of medical ratings was devised to give the employment manager and the supervisor a general picture of the physical and temperamental capacity of the new employee, without revealing specific medical information.

Each new employee-applicant, upon the completion of his pre-placement examination, was given a rating of A, B, C, or D.

A rating of D, sparingly given, indicates that the applicant is not eligible for employment with the organization. It is given when the applicant has a communicable or infectious disease, or some other physical or mental condition that would render his employment undesirable.

A rating of A indicates an excellent physical and mental status. From a medical standpoint, such employees may be transferred to almost any job in the plant without further reference to the medical department.

Class B individuals are those with minor physical defects which do not interfere with the efficient and safe performance of their assigned jobs. When such employees are recommended for a job change, the employment manager informally checks with us prior to making such change. In the medical department, an appraisal of the individual's physical condition and medical progress is made from his record, and, if nothing is found to render hazardous his employment in the new job, informal permission for the transfer is given, usually by telephone.

Class C individuals are those with significant defects, who, although qualified for the particular job for which they were hired, must have a careful re-examination before transfer to a new job. It is into this class that our handicapped persons fall—those with markedly limited vision, with loss of fingers or hands; those with significant deafness, and similar defects of a nature which might create serious hazards were their assignment to jobs not watched with an alert and understanding eye.

Every Class C individual recommended for a job change must report to the dispensary for examination and a re-evaluation of his capabilities. If he is found fully qualified for the new job, written authorization for the transfer is issued.

We have found that the rating system, used in conjunction with an elastic set of physical standards, performs a valuable service in preventing the initial assignment, and subsequent transfer, of individuals to jobs for which they are not suited, and in which they become unduly subject to accidents.

The medical department turned its attention to other problems as well. For many years, it had been common practice, although forbidden by unenforced company rules, for employees to give each other first aid in event of minor injuries. An individual would use the corner of a dirty handkerchief to remove a foreign body from the eye of his fellow worker, or would work bind cuts with a rag—and the affected worker (usually also infected) would return to

work without bothering to report to the dispensary for proper medical attention. Also every department had its own secret little supply of stale hydrogen peroxide and completely unsterile bandaids. Small wonder, then, that this type of treatment frequently resulted in severe infections, with subsequent disability and lost time. This we changed. A campaign of publicity and education was undertaken to impress upon all employees the fact that for any injury, no matter how small, they were to report at once to the plant dispensary. Supervisors were made directly responsible for seeing that this procedure was followed.

This discouraging of amateur physicians, and the administration of proper first-aid treatment resulted in a marked and prompt decrease in the incidence of complicating infections.

The medical department also established and maintained liaison with the personnel research section to permit a more thorough study into the problems of industrial fatigue, which, as we all know, is a fertile source of accidents. The work done in this field alone is beyond the scope of this talk, and I mention it only in passing.

During this time, our safety engineer by no means neglected the fields of safety education and publicity. In addition to the usual measures of bulletin-board-posters, safety suggestions and contests, several special projects were undertaken. Under his direction, the practice of periodic inspections by safety committees was revived, and, in line with our coordinated efforts, the plant physician was made an integral part of each safety committee.

An exacting and most useful piece of work was the preparation, by our safety department, of a sound film strip on safety. With pictures taken in our own plants, with our own employees as the actors, various hazards of action and procedure were dramatized in a personal manner. This film was presented to all of our people, in groups, with impressively good results. It has now become a regular feature in the safety indoctrination program for new employees.

Every Friday afternoon a meeting is held, under the auspices of the safety department, attended by all employees who have been hired during that week. At this meeting, each worker is indoctrinated into company safety policies. To each is explained his responsibility in safe plant operation. The chief nurse then delivers a brief talk on the medical department and our medical policies, and stresses the necessity for reporting promptly to the dispensary for treatment of minor injuries. The safety film is presented and an open forum subsequently held for the discussion of any questions that may arise.

One important accomplishment of our program was the definite fixing of responsibility for safety directly on the foreman or supervisor. We early realized that no safety engineer or plant physician could get to know any department as thoroughly as its supervisor—who lives with it, works with it, knows every machine, every procedure, and, most important, every man. Every supervisor was made aware that safety and safety regulation in his department are just as much his function as production. This was done in a series of safety classes and seminars, in which all supervisors participated, in groups.

As a direct follow-up, the medical department developed a new "Report of Accident" Form,* in which the supervisor became an integral part of the chain of investigation and correction. The fact of the report is fairly standard, and includes all data pertinent to the accident. The patient's story of what happened is taken down as nearly as possible in his own words. Diagnosis and disposition of the patient are recorded. Recommendation for investigation by the safety engineer is indicated as "none," "routine," or "urgent." In "urgent" cases, the safety engineer is also promptly notified by telephone.

Prepared in triplicate immediately after the patient has been cared for, all copies are taken without delay to the appropriate supervisor. He makes an immediate investigation of his own, on the spot. He takes statements from witnesses, and records the full story on the form, including action he has taken, or will take, to prevent recurrence. The form is then dated and signed, and all three copies, still intact, are sent to the safety engineer.

The safety engineer, with all the facts at his command, may reinvestigate, at his own discretion, and will make his own recommendations for correction of the hazard in the appropriate space on the form.

All three copies are then returned to the plant physician for closing remarks, including a complete diagnosis, statement of lost time, prognosis for recovery, and comments on the recommendations. Appropriate copies of the completed form are then distributed, for permanent file, to the safety engineer and the appropriate supervisor, and the original is retained in the files of the medical department. Each individual concerned will, therefore, have a copy of the entire story, with all the recommendations that have been made.

Some judgment should be exercised in the use of this form, of course. It need not be used for every little scratch or bruise, but it should definitely be used in all cases involving lost time, permanent disability or death, and wherever a definite safety hazard exists.

Through the use of this form, the circle of control—from plant physician to supervisor to safety engineer to plant physician—is complete as a functioning unit.

In case of a difference of opinion as to the cause of the accident or the recommendations made for its correction, a conference is called of all three parties, and an attempt is made to resolve the difficulty by open discussion, taking full advantage of the services of the technical specialists in our other divisions.

As a result of placing direct responsibility for safety on our supervisors, we now have a situation where every new employee being broken in on a new job, is given instruction not only on the operation of his machine, but also in safety precautions and the proper use and care of his safety equipment. The new man is taught that safe operation means better operation, and, in the long run, greater production.

No longer, in our plants, does a supervisor cluck his tongue sympathetically at an accident in his department, and then forget about it. As an integral part of the circle of control, he knows, that shortly after the accident, he will receive a Report of Accident Form which will require his personal investigation. Being thus made constantly aware of his responsibility for safety, the supervisor makes safety inspections and safety instruction part of his daily routine.

In our efforts to assist the supervisor, we have even gone a step further. Being firm believers in the "ounce of prevention" school of thought, the medical department forwards to each supervisor, at intervals, an analysis of the non-lost-time accidents treated from his department. This includes the bruises and splinters, the cuts and small burns, the sprains and abrasions—the so-called minor mishaps.

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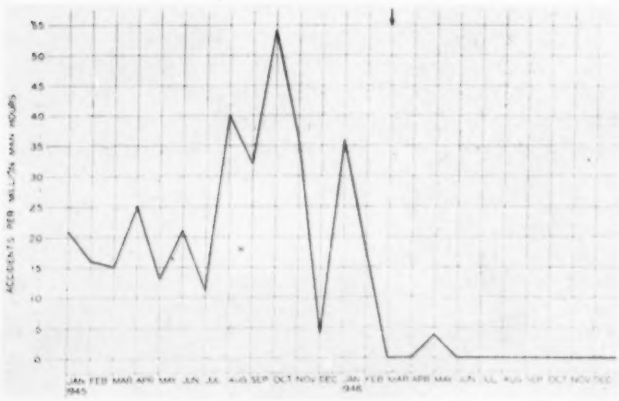
*This "Report of Accident" Form was described and illustrated in DR. BRESLER'S article, "Systematizing Accident Investigation," in INDUSTRIAL MEDICINE, 16:4, 172-173, April, 1947.

The sole purpose of this report is to indicate to the supervisor the types of minor injuries occurring in his department—to show him the chief causes of the trivial accidents that all too frequently develop into big ones. No rates are calculated for these minor accidents, nor are comparisons made of different departments, owing to the great variation in the nature of the work and the different degrees of accident hazard. This procedure eliminates any tendency to discourage employees from reporting for medical attention in an effort to improve the incidence rate. At the same time, it gives the supervisor a direct lead to the most prolific sources of accidents in his department.



Sharp & Dohme
Record of Safety, 1945-1945

I have spoken at some length about the safety problem we faced, and have discussed some of the things we did about it. The question then arises—did it do any good? For the answer, let us consider the chart, which indicates the monthly accident frequency rates for our main plant for the last two calendar years. In 1945, our frequency rate went below 10 just one time, and that was in December, when it dipped to four. In October of the same year, however, it hit an appalling 54. The average for 1945, was 23.7. In January, of the following year, the rate was 36, and in February, 17.

On the first of March, the new program was put into effect—indicated on the chart by the arrow. The results were very gratifying. During the remainder of the year, we smashed all of our own previous safety records. Our main plant operated over seven consecutive months without a compensable lost-time accident, an exposure of over 1,400,000 man-hours. Our annual frequency rate for 1945 was 4.6, a decided improvement over the 23.7 for the previous year. The rate for 1947 continues good, averaging below seven, so far.

Our program is still far from complete. There are still many loose ends that need tying up. We feel, however, that we are making strides in the right direction.

DR. R. R. SAYERS, in his new position as chairman of the medical board of the Welfare and Retirement Fund of the United Mine Workers of America, will advise trustees of the miners' fund on health and medical problems, and will assist in carrying out recommendations contained in the Medical Survey of the Bituminous Coal Industry issued last spring by Rear Admiral Joel T. Boone. This recommends establishment of strong local health departments; improvement of basic sanitation; organization of health education programs; industry-wide studies and research on nature, occurrence, and control of occupational diseases and disabilities; rehabilitation programs; and expansion of company industrial medicine programs, including physical examinations of employees, and provision of adequate first aid and other medical facilities.

A Preliminary Report on a New Method of Penicillin Therapy

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IN THE discovery of each new chemotherapeutic agent it becomes necessary to revise the treatment and management of those diseases which respond to its administration. The treatment of surgical infections was tremendously improved with the advent of sulfonamides, and with the use of penicillin we have added another powerful agent in our armamentarium against infections. We believe that we have added still more effectiveness to penicillin by the simple infiltration method around the area concerned. The method of administration of penicillin either for actual infection or as a preventive measure has largely been by the intra-muscular route and less frequently by intravenous, the benefits being obtained by systemic absorption alone. Local topical therapy has been tried by the writers and other surgeons with discouraging results.

In the treatment of any disease, diagnosis is of primary importance. In surgical infections diagnosis should include the portal of entry, the extent of involvement, the part or parts affected by the disease and the etiological organism or organisms. Fortunately, most of the pathogenic bacteria which are likely to produce surgical infection are sensitive to penicillin, thus it is justifiable to institute penicillin infiltration therapy either as a preventive measure or if a definite diagnosis of suppurative infection is confirmed without waiting for reports of the cultures to be returned. In this article we want to introduce a new and satisfactory method of administering penicillin using illustrations of several cases on which it has been tried.

As everyone know, who works in the surgical field, there are occasionally discouraging infections following removal of pilonoidal cysts. The wound discharges pus fluently and healing time usually drags on from four to six weeks and even longer, in spite of all previous methods of treatment. In the past year and a half we have had several cases in which this occurred. In each case penicillin was infiltrated in the surrounding tissue (100,000 to 200,000 units in 5 to 10 cc. saline). Two days following the initial dose the individuals were again seen, the infection had markedly subsided and following the second and sometimes the third infiltration, the purulent exudate had completely subsided. At the end of a period of seven to 10 days after treatment was initially started there was a nicely healed scar free from purulent discharge. We, now, are infiltrating penicillin into the wound at the time of removal of the cyst and to date we have had no discouraging results. Penicillin was not given intramuscularly in these cases. The same holds true in infected operated areas. Prior to penicillin infiltration, even with intra-muscular injections of penicillin, every four hours, wounds drained for days, even weeks, before healing was completed. With penicillin being infiltrated at the time of closure very few will drain and, if drainage does occur, reinfiltrating the area two or three times at two-day intervals will immediately stop all drainage and permit closure. We have found also in the closure of incisional herniae with black silk, the likelihood of the suture forming a sinus tract from infection has been materially decreased when penicillin has been infiltrated at the site of the silk suture and the wound.

During our experimental period with penicillin in-

filtration we had the opportunity of using it on compound fractures, some simple, others markedly comminuted. In the past in spite of all preventive procedures in combating infections, a certain percentage of cases developed infection resulting in osteomyelitis and non-union, necessitating various methods of trying to get bone, as well as the wound, to heal. Several of these cases have had surgical treatment over a period of one to several years; some eventually having their effected extremity amputated. We have had several cases which we have cleaned the wound with hychlorite, fitted the fragments into position, infiltrated the area with penicillin (300,000 to 500,000 units in 10 to 15 cc. saline), sutured the skin up tightly, put the extremity in a suitable splint with or without gentle traction, and both bone and soft tissue healed by first intention. With these cases penicillin was given intra-muscularly for approximately one week afterwards. To date we have had very few failures.

When wounds, ulcers and gangrenous skin areas to be skin grafted present themselves, there does not seem to be any area too recent, too much infected, too extreme or too inflammatory to be immediately successfully grafted. Topical application does no good at all.

The procedure we follow in our skin grafting is as follows:

1. Scrub the diseased area with soap and water.
2. Drape the area with a sterile field cloth.
3. Inject the area to be grafted with 100,000 to 200,000 units of penicillin in from 2 cc. to 10 cc. of saline. The amount of solution used depends on the amount of soft tissue involved at the area. With ulcers over the skin area naturally only a small amount of the concentrated penicillin can be used, thus the ariation in the strength of solution. If the area to be skin grafted is done under local anesthesia, the penicillin can be dissolved in the local agent. General anesthetic is usually preferred, owing to most areas being quite sensitive.
4. Remove by sharp dissection all dead or devitalized tissue to healthy bleeding tissue. Sharp cut the skin edges.
5. Apply Thiersch or other skin graft and sew into position.
6. Cover with one layer of Xeroform gauze.
7. Apply cotton gauze pressure.
8. Redress in four or five days.
9. Regrafting by above technique any portion of graft that may have died due to circulatory failure.
10. The following four or five days after grafting, penicillin is given intra-muscularly.

CONCLUSION: (1) Topical application does no good at all. In nature the Lord did not make a topical application of penicillin to protect the penicillin mold but infiltrated the mold substance.

2. Most pathogenic bacteria which are likely to produce surgical infections are sensitive to penicillin; therefore, it is not necessary to wait for culture reports of the offending organism or organisms.

3. The injection of concentrate penicillin solution has no deleterious effect on tissue.

4. A breakdown of the notoriously infected pilonoidal cyst area can be avoided by the infiltration of penicillin or, if infection has occurred, infiltration with penicillin will immediately stop all drainage and permit closure.

5. Discharging wounds from infected operated areas have been reduced to a fracture of the incidence that occurred prior to use of penicillin by infiltration. When wounds have become infected reinfiltrating the area with penicillin cut the healing time immediately.

6. In compound bone work we have a chemotherapeutic agent in our armamentarium that will cut our percentage of infections to practically nil.

7. In skin grafting the time saving element is of great value. Before this method was tried it took weeks for devitalized tissue to slough off and the wound to clean up. Now skin grafting can be done immediately, and furthermore there is no comparison in the nice smooth skin resulting from this method, with the end result of a long delayed granulating area with scar formation and even in some instances keloid formation.

Industrial Dentistry

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INDUSTRIAL dentistry has been recognized by the American Dental Association. This is because of the results accomplished by the less than one hundred dentists actively engaged in the program. Industrial medicine considers industrial dentistry a valuable part of the general health service in industry.

In the few years of our existence as a National Association many manufacturers have established dental clinics for their employees. There are many types. Time will not permit a discussion of each. Needless to say each has its own peculiar problem, such as industrial hazards, standards of employee rating, methods of financing, etc. Our task is not to convince the persons acquainted with industrial dental medicine. Rather we must correct the misunderstandings that prevail among manufacturers, employees and dental practitioners. Many manufacturers fear that it is a scheme whereby the employee can extract more money from the company earnings. Some employees think that data obtained by the dentist will be used to bring about their dismissal. A great number of dentists are apprehensive of the economic reaction upon their livelihood. All of these doubts must be dispelled through practical information available to anyone desiring it. This paper has been prepared to serve as a means of stimulating the collection of facts and ideas from all of those familiar with industrial dentistry. It is in my estimation the only means at our disposal to acquaint those who are planning to establish the program in their factory as well as dentists contemplating entering the work.

It is by no means the thought of the essayist to present this material with the idea that it is the complete answer. After nearly a quarter of a century devoted to this type of dentistry, naturally one acquires some ideas that may be of use to others. If we will each contribute some material, a vast fund of useful information can be prepared by some group within our membership to guide the men who will help to build better clinics throughout the country in the future.

Permit me to deviate somewhat from the title listed in the program. Perhaps we should call it "Selling the industrial clinic to the employer, the employee and the practicing dentist."

A definite idea of what industrial dentistry is should first be stated. Industrial dentistry is service rendered by a licensed dentist in the employ of some industry, the service rendered to be such as to improve and maintain the production ability of the employee through better health. Industrial dentistry should never be offered to employees as a means of coddling to get work done. When such conditions as *free dentistry* exists in an industrial clinic the purpose of such

service is lost. By free dentistry I mean never adopt a program where the purpose is to help the employee get his dental work done for nothing—rather explain to him that the service is to make him a more efficient employee. Industrial dental programs are for health and production efficiency only.

The following should be considered by the employer before establishing the industrial dental clinic:

1. Are there enough employees to warrant it?
2. Do you need a full-time or part-time dentist?
3. Insist that the *full-time* dentist be just that and have no office in any other place.
4. If you have a part time dentist, have an understanding of the arrangements with the local dentists.
5. Pay a salary that will attract a high class of staff, with frequent increases to keep them with the clinic. This builds up a type of personnel that is willing to specialize in this type of dental service to the advantage of the employer and the employees.
6. Do not start something you may have to curtail later. The Labor Relations Act prohibits any industry from taking any rights from an employee once such rights have been established.
7. Funds should be budgeted to permit the staff to attend local, state and national dental meetings, study clubs, etc., to help them keep up with the new techniques, etc. This builds up a respect for the service within the body of the employees.
8. Always consider industrial dentistry a health service and keep it such. It should never be another "gimme" to the employees. Make your rules and be firm in keeping them.
9. Type of personnel should be high—such as:

(a) A person capable of doing the work well, improve the methods, hold the respect of the employers, employees and private practitioners in the locality.

(b) He should be able to administer the department, make decisions that are final, make purchases, be sympathetic and treat the patients all alike with no show of feeling that the work is charity.

(c) He should be one who will cooperate fully with the medical staff, should one be attached to the industry, and to the local medical men.

(d) He should be able to supervise educational programs on dental health throughout the industry.

(e) An oral hygienist may be necessary to do the prophylaxis when the number of employees warrant it. This must be a registered hygienist to conform with the laws of most states.

(f) A trained nurse should be on the staff where general anesthesias are administered. In this case, the nurse could be the secretary, receptionist, the one to process the x-ray films, sterilize instruments and keep complete records.

10. A very complete set of records should be kept of all work done. This is of value as a check on recovery or reoccurrence of conditions and in use at compensation courts and for possible identification purposes.

LOCATION AND TYPE OF ROOM FOR CLINIC: The clinic should be a part of or adjacent to the first aid or health department and medical service wherever possible. It should be made large enough so that expansion is possible. It should normally consist of a waiting room, operating room or rooms, laboratory for sterilizing, supplies, etc., and an x-ray dark room. When a hygienist is to be employed more than one operating room will be necessary. The clinic should be finished pleasingly, with proper heat, light and ventilation. Good surroundings raise the employee's valuation of the service. This need not be expensive but typical of a dental office rather than just a stall back of some furnace or machinery. Partitions should go to the ceiling and doors used that may be closed. The privacy thus obtained will be appreciated by the patient and also be a comfort to the waiting patient. All of these facts will make the employee feel that he is well thought of by the employer and thus make him a more cooperative employee.

EQUIPMENT NECESSARY: Dental chair; dental unit; x-ray unit; necessary operating instruments; instrument cabinets; x-ray dark room; view box for x-ray diagnosis; partitions that reach the ceiling; rubber mats at chair; record files; desk for staff; wash bowls and sink; adequate library for work of program; adequate laundry supplies; drugs and supplies; sterilizer; film safe box; storage for supplies; fluorescent overhead lighting; chairs and coat rack in waiting room; subscriptions to a few picture magazines; telephone.

TYPES OF CLINICS: (1) Where no charge is made to employee for work done or time lost while at clinic, company pays all cost including salaries of the staff. (2) Work performed for employees *only*. They come on appointments usually on off hours from work if possible. (3) Following work done. These services vary according to desire of the clinic: (a) extractions; (b) x-ray diagnosis; (c) prophylaxis; (d) treatments of toothaches; (e) care of mouth lesions (Vincent's occupational diseases); (f) miscellaneous: re-cement bridges and inlays; adjust occlusion; adjust dentures, etc. (4) Clinic where patient is charged for service and this is used to defray expense of the clinic. (5) Clinic where *families* are treated the same as the employees. (6) Clinics supported by funds paid into a health fund by the employees. (7) Private dentist employed to do work at his office, part time, paid by company or part by company and employee.

RESULTS: *Extractions* at no cost to the employee have led to more restorations by the local dentists, according to their statements. It has been a big feature in improving and maintaining employees' health. *x-ray* diagnosis with pictures available to the dentist assists in getting a better type of service to the employee. *Prophylaxis* has, of course, been worthwhile. *Miscellaneous* work has saved the employees waiting at the local offices thus preventing a break in the production schedule in the plant and in many instances has saved the local dentist annoyance. *Treating mouth lesions and toothache.* Relief from ache keeps the employee at a high production level in his work. Mouth lesions such as Vincent's angina, when checked and prevented, pay off in health and production. Mouth lesions from industrial hazards likewise cause much loss of time and production. Recognition, and treatment where possible, pay off well.

In establishing a dental program in industry a few things must be kept in mind

1. This type of work is not easy. The dentist in charge must expect to work hard, must be diplomatic, sympathetic and willing to live to a standard that will gain the confidence of all parties involved, and a man who will make this work a specialty.
2. He must be progressive, capable and ethical.
3. The service must never get away from the standard of a health service.
4. If it will not increase the health and efficiency of the employees, do not start it.
5. Never start something you cannot continue.
6. Give the dentist-in-charge your full support at all times.
7. Have a full understanding at the beginning with the dentist-in-charge and the local dentists as to what work will be done. Then stick to it.

8. By all means treat every employee the same.
9. Look to the future before you start.

I sincerely hope that the ideas expressed will be of some value to persons interested in this type of dental service.

For over 20 years I have devoted my entire time to the Corning Glass Works Clinic, which I had the pleasure of organizing in 1925 with the late DR. WILLIS C. TEMPLER, Medical Director. Experience has convinced me that such a program administered in fairness to everyone involved is a very worthwhile part of a successful industry.

It has been our good fortune to find that dentistry has an important place in industrial medicine through cooperation with the medical staff in diagnosis and treatment. Many instances showing dental knowledge have assisted in finding the cause of inefficiency on the part of the employee, are in our files. I am proud to be in this program of dental service, and pay tribute to the fine cooperation of our Medical Director, DR. LEWIS J. GRAHAM, and MR. KARL DUNN, our Industrial Hygienist.

Degreasers and Their Dangers

HARLEY L. KRIEGER, M.D.,
Medical Director, Ford Motor Company, Detroit

TIME does not permit that I go into all the details, chemical formulae or standard equipment used by modern industry in the routine degreasing of the many parts of an automobile. You may read and get all of that information from the many textbooks on the subject in the privacy of your study. However, I would like to give you a brief idea of some of the things you are liable to run into, some of the things you will not find in the textbooks, some of the things that only bitter experience has taught, in the operation of various degreasers. Let me state right now that degreasers properly installed, scientifically run both from the manpower and the mechanical angle and adeptly maintained, will cause you little if any worry. Unfortunately, they are not always properly installed, the manpower is not always adequately trained, and the servicing sometimes becomes a matter of convenience.

Degreasing is absolutely essential in industry, and the consensus of opinion seems to place the chlorinated hydrocarbon solvents high on the list of efficient degreasers. We would like to confine our remarks and suggestions to one of these hydrocarbons; namely, permachlor or trichlorethylene. First, from the production standpoint, solvent degreasing is a simple process, as it depends *merely* upon the dissolving of oil and grease by a stabilized non-inflammable chlorinated hydrocarbon solvent either in the heated liquid or vapor state. Second, from a medical standpoint it makes very little difference if the solvent is used cold, hot, or as a vapor. We are not interested in knowing the degreasing job, basically as a vapor job, as an immersion job, or as a spray job, so long as everything goes as it should—so long as there are no fumes in the vicinity of the operation, and so long as the employees do not begin to make their appearance in the hospital with dermatitis, or other evidence of toxic conditions.

There is absolutely no argument regarding the efficiency of the chlorinated hydrocarbons as a degreaser. A piece of oily, greasy steel dipped in permachlor comes out free from oil and grease. So do your hands if you are so unfortunate as to place them in the solvent, and the employee wonders why his skin dries up and cracks, why a "rash" makes its appearance, and why a secondary infection, followed by loss of time and possible ankylosis of a joint, should all come just from dipping one hand, and then only for a second or so, in the solvent. Now, please don't misunderstand, that train of sequences does not necessarily follow in every case, but it just happens often enough to keep us worried.

As before stated, we wish only to place before you some of our experiences in tracking down leaks in the handling of solvents. If these experiences could be placed as an end chapter in the book of solvents, much time and misery could be saved.

It is not an uncommon experience to walk into a department and smell the odor of permachlor—perhaps just a faint odor is discernible. Now, it's a well-known fact that if you can smell it, the concentration, roughly speaking, is around 100 p.p.m.; and, since that's the maximum allowable concentration, you immediately begin to look for trouble, and, consequently, go over to the degreaser tank. But to your surprise no permachlor fumes are discernible, so back to the original spot you go, and pretty soon you spot a five-gallon paint pail—half full of the solvent—no cover—one of the boys has dipped this out of the tank and in all probability he is using or going to use it as a cleaning fluid for his greasy coveralls. It does a good job, but the cost usually is way too high.

On the other hand, the permachlor fumes may be arising from the tank—too full—too hot—or failure of condensing coils—these failure factors are either due to failure of thermostatic controls or failure of supervision to keep the amount of the solvent in the degreaser at a constant level.

In another type of degreaser; i.e., the conveyor type, late in the afternoon it is noted that production is lagging, consequently the conveyor is speeded up and the stock passes through the solvent and over the drip pans too rapidly, carrying out into the room some of the liquid solvent. This readily evaporates and the toxic fumes spread for considerable distance into the workroom.

Occasionally there are breakdowns of mechanically-operated degreasing tanks. Then, of necessity, the work must be done in smaller tanks—by hand-dipping of stock, placed in trays and then in the solvent. Here, again, the draining period is cut short and the stock sometimes still wet is passed to the next operation.

In one of our small branches outside of Detroit, they had a replacement loss of 35 gallons of permachlor daily. They were using a standard Detrex degreaser. One could not help but wonder where the solvent went—so out we go. This branch manufactures lamp headlight frames, and these frames went through the degreaser on a conveyor and were so hung that they carried out about 4 to 6 mls. of the solvent on every frame. This solvent either spilled or evaporated into the workroom. The manager was contacted and a suggestion was made correctly to hang the lamp headlight frame so that it would drain and dry before leaving the degreaser. Returning two days later with the necessary equipment to check the vapor concentration, we were amazed to find no odor of permachlor in the workroom. Very little replacement was needed and tests of the air were well within safe limits.

From 12.4 to 15.7 thousand gallons of permachlor

Presented at the Thirty-Second Annual Meeting of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, Buffalo, New York, April 30, 1947.

per month are used in the Rouge plant. This solvent, if used improperly, is toxic; consequently, great care must be exercised in its use and handling. As stated, very little trouble arises from the use of standard degreaser tanks, either the conveyor type, or the smaller tank, especially if the latter is equipped with a hoist having delayed raising action to allow for drainage of all fluid in the condensing area. On the other hand, considerable trouble may develop from the indiscriminate use of permachlor in open containers. Yet, even using the solvent in this manner may be accomplished with a considerable degree of safety, provided the following measures are carefully followed:

1. The container size, i.e., the open surface area, should be under 100 sq. in. and should be covered when not in use.

2. The amount of agitation of the solvent, i.e, shaking the solvent or shaking the small parts in the solvent, using a brush or a spray, is definitely frowned upon. Any method that will increase the surface area of the solvent will increase the amount evaporated. This is definitely what we are trying to avoid.

3. Since we have no "free board area" in small open degreasing containers, the stock must be allowed to "drip dry" within the container before being removed and placed on the work bench. This alone—this time-consuming drying period — probably causes more trouble than any other single factor. Our surveys have consistently indicated that most of the air contamination is caused by the parts being too rapidly withdrawn from the container and carried away dripping permachlor. Again, let me caution you—if you must use small open degreasing pails or containers, allow sufficient time for the stock to dry before removing to the work bench.

4. All degreaser operations, and especially open small tanks, must not be located near open windows or forced air ventilation—as any air current across the surface of a degreaser tank will increase the evaporation of the liquid.

5. *The worker* should not stand directly over the solvent when cleaning the parts. *The foreman* should know definitely the average amount of permachlor used in his department. Any increase in this consumption not accounted for by increased production should be immediately checked.

So much for the small open containers. Now just a word of caution regarding the larger mechanically controlled tanks:

1. All men employed around degreasers, after being thoroughly indoctrinated in the running and servicing of degreasing equipment, should be turned over to the medical department, the hygiene department, and the safety department where one or several talks should be given on the dangers, and the toxicity of the solvent explained—not with the idea of frightening these employees, but simply with the idea of teaching them how to handle this solvent carefully and intelligently.

2. These men, once trained, should be anchored to the job—not loaned out—not transferred—and no new man added to the staff without a definite training period.

3. Annual or semi-annual examination of all personnel working around solvents.

4. Absolute control of every gallon of solvent used; written requisitions preferred. No drums of the material sitting around where an employee may pour off a gallon or so to clean some overalls; and, any employee found so using the solvent should be sent to labor relations for proper correction.

5. Rigid routine inspection by:

(a) Safety inspector for mechanical defects.

(b) Industrial hygienist for vapor concentration.

(c) And, by the medical department for possible external and internal symptoms.

In conclusion, permachlor is an excellent degreaser—perhaps the preferred degreasing agent. It is toxic. We know that in manually controlled or automatic degreasers it can be and is used safely.

When exceptions occur, it is generally due to failure to follow operating instructions or to faulty mechanism.

Permachlor in small open containers may be and is being used safely. We assume that more than ordinary care will be exercised in the use of open container degreasers and that the control measures previously suggested will be substantially followed. "Cutting time" in the degreasing operation is false economy.

Permachlor is likened to fire. Controlled it is man's servant. Uncontrolled it is disastrous.

Use of Plastic Chips in the Control of Chromic Acid Mist

J. E. MOLOS,
Industrial Hygiene Engineer, Industrial Hygiene Section, St. Louis Health Division

THE great strides made in the chromium plating industry since the turn of the century have considerably increased the problems of industrial hygienists in their efforts to control the health hazards incident to the electroplating industry. One such problem which has already received a good deal of attention is that of the control of chromic acid mist in the workers' breathing zone above the chromium plating tank.

As a product of the cathode reaction in the chromium plating process, hydrogen is evolved. Upon breaking the surface of the solution, the gas carries some of the chromic acid into the surrounding atmosphere as a fine spray or mist. This mist when breathed in sufficient concentration and over a long period of time may cause injury to the health of the exposed workers through irritation and later ulceration of the nasal membranes.

Up until recently control of chromic acid mist has been effected largely by means of local exhaust ventilation. This type of control, while effective, results in a considerable loss of chromic acid through the exhaust system. Actual measurements of chromic acid loss at plating tanks operating with adequate ventilation have demonstrated that more chromium was being lost in spray than was being deposited on the cathode. Other reports indicated losses as high as five to 10 times the metal converted into chromium plate. This acid can be reclaimed by installing a recovery unit in the exhaust system, but this practice does not appear to be a very common one in the St. Louis area.

A newer practice and one which appears to be becoming popular is the surface application of plastic chips as a means of controlling chromic acid spray. The use of floating solids on solutions to prevent excessive spray is not new, however. Rubber cubes have been used on iron-plating baths in this country, and cork particles as well as paraffin-coated glass wool have been mentioned in German literature as having spray reducing possibilities.

The essential requirements for use of such a material in the capacity of a chromic acid spray reducer are as follows:

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1. The solid particles must be able to float on the surface of the chromium plating bath.

2. The particles must not be affected by such physical conditions as heat and electricity as exist in chromium plating tanks.

3. The material must be inert chemically to all substances encountered in the plating solution.

Since many plastics easily fulfill these requirements, their use has been indicated. Some of the plastics in present use are *lucite, methacrylate,* and *polystyrene.* Many others are undoubtedly equally satisfactory. The size and shape of the particles are a matter of convenience, depending primarily upon the physical characteristics of the article being plated. The plastics are used in the form of crushed crystals, flat squares, rods, etc. The size of the chips should be sufficient to prevent their adhering to the plated article.

A field test to determine the effectiveness of one type of plastic chip covering is described by W. P. Davis. In this test conducted at the Naval Air Station, Pensacola, Florida, air samples were taken using the Greenburg-Smith impinger apparatus. Meticulous care was exercised in sampling and analyzing to insure easily reproducible results.

The essential parts of the control procedure observed are as follows:

1. The chromium plating tank was screened off on all four sides with canvas to eliminate any sampling error caused by air movement within the room.

2. The local exhaust ventilation, consisting of two lateral slots situated on opposite sides of the tank 8 inches above the surface level of the plating solution, was maintained constant at 170 cubic feet of air per square foot of tank surface area.

3. All sampling was done while one landing gear inner cylinder airplane part was being plated at a total of 1000 amperes and six volts.

4. Two and a half pounds of spray-reducer chips per square foot of surface area were used.

When the samples were collected and analyzed and the data tabulated, several interesting results were indicated.

With a 60-minute sample, taken eight inches above the liquid surface level and four inches from the anode, using an exhaust ventilation rate of 170 cubic feet of air per square foot of surface area, the average atmospheric concentration of chromic acid obtained when using spray reducer chips was found to be 0.2-0.5 milligrams per 10 cubic meters of air. Under exactly the same conditions but not using spray reducer chips, 45-50 milligrams of chromic acid per 10 cubic meters of air were found. The maximum allowable concentration for chromic acid is given as one milligram per 10 cubic meters of air. It is quite apparent that the use of the chips alone reduced the concentration of chromic acid at the point of sampling 100 fold of better. It is well to keep in mind, however, that these samples were not taken at the worker's breathing level, but at a point 8 inches above the surface of the solution or at the same level as the exhaust slots.

In order to determine the effectiveness of the plastic chips when no exhaust ventilation was provided, a second sample was taken at the prevously described location, but this time the ventilation was turned entirely off. A 15-minute sample taken under these conditions indicated that, even with the blanket of plastic chips, the atmospheric concentration of chromic acid in the operator's breathing area was found to range from 160-170 milligrams per 10 cubic meters. This test thereby indicated that a lateral, slot-type local exhaust ventilation system to remove gases and spray should be provided in addition to the spray reducer pieces in order effectively to safeguard the health of the workers.

When it became recognized that plastic chips are effective in reducing chromic acid mist, the importance of blanket thickness was questioned. Data published by the Udylite Corporation shows some actual comparative test results. These results show an inverse relation between the blanket thickness of the chips and the atmospheric concentration of the chromic acid. Thus, for a 1-inch layer the atmospheric concentration of acid was 11.9 milligrams per 10 cubic meters; for a 2-inch layer, 8.0 milligrams per 10 cubic meters. Practical considerations tend to restrict the blanket thickness to a large extent, the usual layers varying from one layer to 4 inches. The thinner layers appear more practical for flash chrome plating; the thicker ones, for hard chrome plating.

Whenever electroplating plants in St. Louis have been found using plastic chips in their chromium tanks, atmospheric samples were taken. Data obtained under these industrial conditions correspond quite favorably with the previously referred to experimental data. All tests, which were made under conditions where plastic chips were used as well as exhaust ventilation, showed no chromic acid concentration whatever in the workers' breathing zone. A limited numbert of tests were conducted at plants operating under conditions where plastic chips were used in the absence of local exhaust ventilation. At one such plant the worker's exposure to chromic acid mist varied from 19 to 30 milligrams per 10 cubic meters. Such figures offer strong support to the contention that local exhaust ventilation should be provided for chromium tanks whether plastic chips are used or not.

IN CONCLUSION, while more work is yet to be done in utilizing plastic chips to prevent chromic acid mist, time.

It is readily conceded that more investigation and future developments may necessitate alterations in these conclusions.

1. A floating baffle of plastic chips is an effective device to help reduce the atmospheric concentration of chromic acid mist over a chromium plating tank.

2. Local exhaust ventilation to exhaust the gases and the spray incident to chromium plating must be provided to insure healthful working conditions even when plastic chips are used.

3. The effectiveness of the floating baffle varies with the blanket thickness, the thicker the blanket the less chromic acid in the atmosphere.

4. Upon further investigation plastic chips may be found to be satisfactory for adequately controlling workers' exposures at chromium plating installations where existing ventilation is not fully effective.

5. The use of plastic chips can result in a substantial economy in operations through the conservation of chromic acid used in the plating solution and considerable reduction in the deterioration of plant equipment.

Further development may indicate the possibility of the use of lower ventilation rates than are now being recommended for chromium plating tanks without a floating baffle. In such an event additional savings may be effected through reducing power consumption and heat loss.

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The Specifications Will Come

Public Law 658 (79th Congress), "To provide for health programs for government employees," effective August 8, 1946, authorizes the heads of Federal departments and agencies to establish, by contract or otherwise, health service programs, the same to be set up "only after consultation with the Public Health Service and consideration of its recommendations." A suggested plan for these programs, developed in the Office of Employees' Health, Bureau of Medical Services, U.S.P.H.S., is published in *Public Health Reports*, 61:46, 1641-1654, November 15, 1946. This plan recommends that the "*physician*" be charged (1) *with an industrial physician's share of responsibility* for detecting the presence of specific occupational hazards, and of tangible and intangible factors within the work environment which are capable of having a deleterious effect upon the health of the worker and his level of productivity," and ". . . for discovering needs, recommending specific measures, and jointly initiating appropriate action for correcting conditions requiring attention," together with (2) *"the full responsibility of a medical specialist* in maintaining sustained collaboration and cooperation between the health unit and other appropriate personnel of the agency or department, and is providing the employee with an optimal work environment." (Italics supplied.) These are practically the only references the plan makes to the "industrial physician." The nurse, however, comes in for more detail. Regarding her, the plan says: "The nurse's responsibility will include performing such services as the following. . . ." after which there is a list of 14 things, described in terms so general as to suggest that complete specifications will soon be forthcoming. For instance, nurse's service No. 8 is "Maintaining approved systems of records and reports." What *is* a "system," a "record," a "report?" And who will approve them? No. 9 is "Compiling records and reports." How compile? And No. 13 includes, as one of the nurse's services, "acting as interpreter and/or liaison, between the employee and his physician, and/or his dentist; between the agency physician and the employee; between the agency physician and appropriate personnel at various levels in the functional organization of the agency; between the agency physician and personnel of the community resources; etc." That one certainly needs specifications, if only to explain—since there will be an "interpreter, and/or liaison" between the employee and his physician and between the agency physician and the employee—how much the employee, or for that matter, either of the physicians, will be allowed to say for and by himself. Also, "liaison" between the two physicians will have to be covered; it seems thus far to have been overlooked.

As for definitions concerning the physician and his duties, "The Public Health Service recommends that . . . the professional responsibility for the health service programs be vested in the physician in charge. . . ." In the text of the law as enacted it is provided that "wherever the professional services of physicians are authorized to be utilized the definition of 'physician' contained in the Act of September 7, 1916, as amended (U.S.C., 1940 Ed., title 5, sec. 790), shall be applicable." The Act of September 7, 1916, says merely "The term 'physician' includes surgeons." But, as *amended*, sec. 790 reads: "The term 'physicians' includes surgeons and osteopathic practitioners within the scope of their practice as defined by State laws." Obviously, for the osteopaths at least, there will have to be, in any event, the careful definition of what "an industrial physician's share of responsibility" is. Nor can the details regarding "the full responsibility of a medical specialist" be omitted.

It seems inevitable, therefore, that specifications, regulations, "directives," etc., are intended to multiply rapidly. No doubt they are already being prepared. It is to be hoped, however, that they will reflect more medicine and less bureaucracy than these first recommendations indicate.

There comes to mind here the experience of a physician now in industrial practice who had his office, prewar, in the so-called "pilot area" of a certain bureaucratic experiment in government medicine then being carried on. Called to the home of one of his allotted patients in the early morning hours, he found the man critically ill with pneumonia. No nurse was available, so he gave the patient's family careful instructions to be followed in his absence. Returning at noon, he realized that the situation was serious unless some really dependable person could be left in charge. So a volunteer neighbor was pressed into service. In the early evening he called again, and everything seemed under control. But shortly after midnight she telephoned him excitedly . . . and he made his fourth call within 24 hours. This visit was a long one; he didn't leave until he felt that the patient was past the danger point and would recover. Later he did the required paper work and sent his report to headquarters. After a while there came a letter from the "area" director reducing his charges ($4.00 per house call) by half, with the statement that "not more than two visits in one day are necessary for any case of pneumonia."

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Health in Industry

—Abstracts of Proceedings of Combined Meetings, Buffalo, New York, April 26-May 4, 1947—

Reported by
C. O. SAPPINGTON, M.D., Dr.P.H.

CHARACTERIZED by the largest attendance in history, and the maintenance of a high level of interest throughout, the annual meetings of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, (32nd), AMERICAN INDUSTRIAL HYGIENE ASSOCIATION (8th), AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (9th), AMERICAN ASSOCIATION OF INDUSTRIAL NURSES (5th), and AMERICAN ASSOCIATION OF INDUSTRIAL DENTISTS (4th) were held at the Hotel Statler, Buffalo, New York, April 26-May 4, 1947.

Among the unique features were discussions of wartime experiences, including hazards incident to the use of the atomic bomb and an official motion picture of the Bikini experiments; a symposium on industrial medical education in American medical schools; separate round-table discussions sponsored by the AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS for chemists, engineers, physicians, and nurses; administrative problems in industrial dental clinics, and relationships to state industrial hygiene programs; panel discussion of in-service education of the nurse in industry; and industrial hygiene symposia on environmental control, analytical methods and particle size. The excellently prepared scientific and technical exhibits also constituted an important feature of the conference.

At the annual dinner meeting of the Associations on May 1, the eighth annual WILLIAM S. KNUDSEN AWARD for outstanding contribution to industrial medicine was presented to DR. CAREY P. MCCORD, and DR. OTTO P. GEIER received the Meritorious Award of the Association for distinguished work in pioneering in personnel, medical and safety organization. Scientific exhibits awards were made to DR. JOHN PICK (injuries, burns and plastic repair); to MR. CLARK BRIDGES (vocational placement of handicapped workers); and to DR. TIBOR BENEDEK (pompholyx and its vaccine therapy).

Radio interviews on various industrial health problems were given during the convention week by MR. FRANK PATTY, DR. C. O. SAPPINGTON, DR. HODGE, DR. CHEN, MISS MAYO, and DR. MCCORD.

Sunday, April 27

IN THE round table meetings conducted by the Governmental Industrial Hygienists, the physicians' group discussed the effects of radioactive substances; dental work in industry, and restriction of jobs for minors. The engineers considered the possibility of a manual on industrial hygiene methods; the engineering aspects of radioactive materials, and instrumentation. The industrial nurses discussed in-plant training, health education, and records and reports.

Monday, April 28

DR. JAMES G. TOWNSEND ("Industrial Hygiene for All the Workers") reviewed the history of the Industrial Hygiene Division of the U. S. Public Health Service since 1940, and especially the experience of the state units. There are now 57 units in 43 states and other areas. There is an acute shortage of physicians and nurses, since but 27 units are provided with such professional personnel. Only a small percentage of compliances have been possible following recommendations for environmental changes and only 15% of follow-up visits have been possible. There is a long list of urgently needed studies. The ultimate goal is protection for all American workers. (See INDUSTRIAL MEDICINE, 16:6, 231-234, June, 1947.)

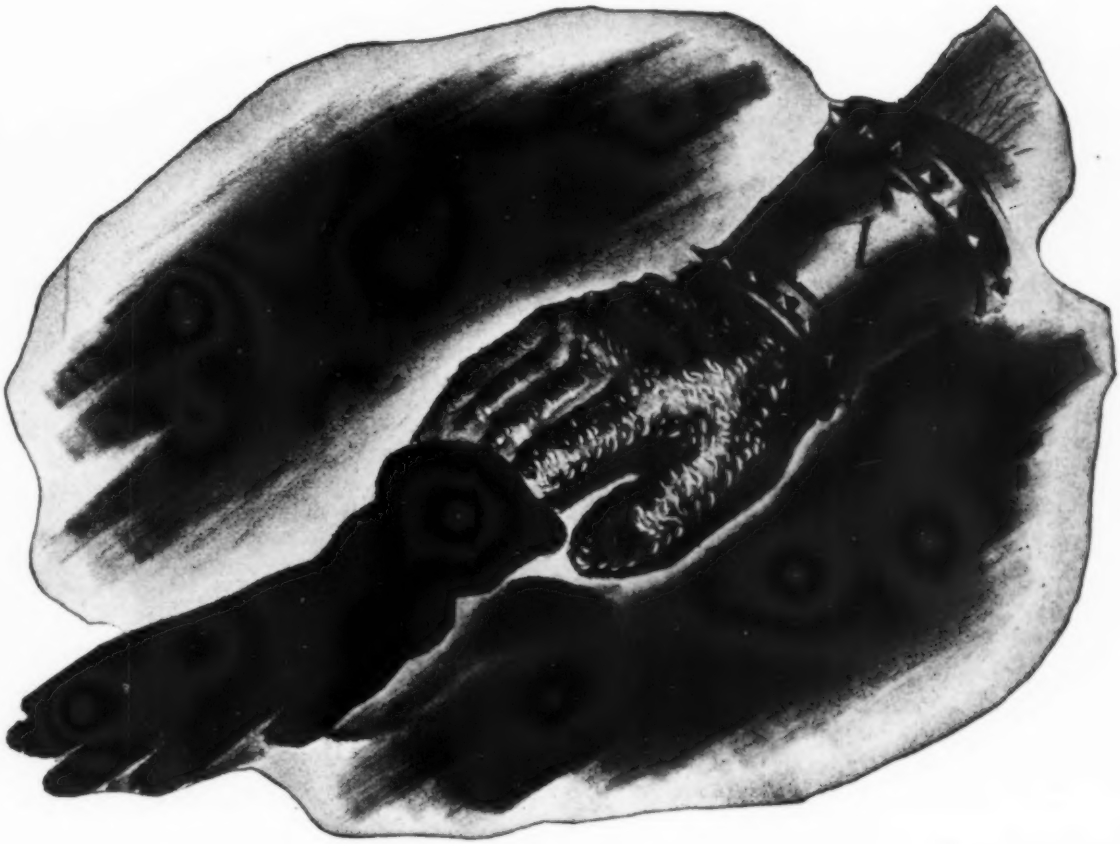
DR. ANNA BAETJER ("Control of Respiratory Diseases in Industry") stated that respiratory diseases are responsible for about 40% of all lost time and about 60% of cases of one or more days' absences among industrial employees. The total cost is over a billion dollars per year. Control methods were considered including control of droplet infection, use of dust suppression, and air disinfection. Personal preventive measures were also detailed, and experiences with influenza vaccine A and B. Emphasis was placed upon the unreliability of cold vaccines. Other factors were chemotherapy, radiation, nutrition, and the control of temperature and humidity, as well as dust and gas control. Vitamins were said to be non-specific in the control of respiratory infection.

MR. THEODORE WATERS ("Role of Codes in Industrial Hygiene Administration") said that such codes were of recent adoption and in the experimental stage. The greatest defect is lack of uniformity which causes confusion. The subject matter varies greatly—some are specific while others are all-inclusive. Most codes do not provide specific measures for compliance or for assistance in complying, on the part of employers. The choice of the word "code" has been unfortunate, since by definition the word implies a "complete regulation of injurious factors." At present, 35 states have codes. The maximum allowable concentrations about which there has been much discussion have a legal status in about 50%; these figures should be subject to annual review and based on average conditions. Industrial hygiene codes should serve as guides, and no pressure should be exerted with respect to exacting compliance.

MR. KENNETH M. MORSE ("DDT Coating of Wall Paper") summarized the experience of his division in reviewing a problem in which the workers thought that a hazard existed in the working environment due to the DDT coating of wallpaper. The problem really was a solvent vapor exposure (35% solution of DDT in xylol or toluol or other solvent). The exposure to the dry powder of DDT was estimated at 6 grams per kilo of weight. Recommendations were made with respect to sanitary housekeeping and washing facilities, including prohibition of eating in workrooms. Toward the latter part of the investigation it became evident that a water emulsion of DDT would be made available, and it is believed that this will control the problem; however, the present status will be followed up and checked.

MR. JEROME E. MOLOS ("Use of Plastic Chips in the Control of Chromic Acid Mists") stated that a blanket of chips has been used in plating tanks, acting as a baffle in the control of emanating mists. The blanket thickness varies from one layer to a mat of four inches in depth and must float on the bath, must not be affected by heat or electricity, and the material should be inert chemically to the substances in the plating solution. The blanket helps to control the mists according to the thickness of the layer, but should be used in conjunction with adequate local exhaust ventilation. Use of this method can result in substantial economy through the conservation of chromic acid and the reduction in equipment deterioration.

MR. H. F. SCHULTE ("Hazards in the Use of Mercury Compounds in Treating Seeds") stated that many types of seeds are treated to kill fungi and prevent seed rotting. Most such products contain organic mercury compounds, such as ethyl mercury chloride and ethyl mercury phosphate mixed with an inert material. Large quantities of seeds are treated by mechanical methods, while in processing smaller amounts, mixing is accomplished by the use of a drum or can. Cases of dermatitis have been reported through contact of the treating material with the skin. In collecting samples by the large impinger and the mercury vapor detector while processing large quantities of corn, no measureable quantities of mercury were found. A laboratory study is really needed involving the devising of adequate sampling and analytical procedures and the determination of vapor pressure and rate of volatilization at different temperatures. Recommended control measures included exhaust ventilation of treating and stacking operations, ventilation of storage warehouses; respirators and protective clothing; and, most important, good housekeeping. Small-scale operations call for increased education in protective methods.



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Take no chances with the surface *skin* especially.

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DR. KENNETH E. MARKUSON ("Sodium Fluoride in the Steel Industry") stated that the great increase in the use of fluoride compounds compared with information concerning possible toxicity of these substances is not at all proportional. The recognition and realization of the possibilities of such problems are quite recent. Fluorides were first used in 1927 in the steel industry and at the present time about 50 plants make use of these substances. Recently they have been used in making "rammed" steel. Sampling of processes with the impinger and electrostatic precipitator showed a maximum of 32.2 mgs. per 10 cubic meters and 13 mgs. per 10 cubic meters in different locations. Local exhaust ventilation was recommended and is believed to be practical. Present information concerning effects of fluorides relates to mainly acute exposures. There are not enough data in existence to establish a maximum allowable concentration with any degree of assurance. It is to be realized that the possibility of other concomitant air contaminants which may cause irritation or similar effects must be considered.

MR. JOHN B. SKINNER ("Toxicology of 2-nitropropane") summarized a limited experience in two plants. In one of these, battery cases were being sprayed with a 20% 2-nitropropane compound in a ventilated booth and another employee stacked the lacquered cases. Concentrations varied between 13 and 28 ppm. These two men had been employed at this work about a year, for four hours a day, three days a week. No ill effects had been observed. In another plant, five men had been dipping forms into a tank of vinylite resin in xylol and 2-nitropropane. Ventilation was considered poor. The concentrations of 2-nitropropane varied from 20 to 45 ppm, and periods of exposure varied from one month to one year. Two men experienced attacks of anorexia, nausea, vomiting and diarrhea, but felt all right the next day. The other three men had severe occipital headaches. All were free of symptoms on Sundays or vacations, and, when methyl ethyl ketone was used, no trouble was experienced. The air samples in the first plant were taken by adsorption on silica gel and the modified method of Scott and Treon; in the second plant the air samples were taken by impinger with isopropyl alcohol. From this limited experience, the maximum allowable concentration is set tentatively at 25 ppm pending more extensive investigation.

Tuesday, April 29

DR. WILLARD MACHLE ("Some Fundamental Considerations in Toxicological Research") summarized the fundamentals of this subject. Research procedures include consideration of (1) subject; (2) definition of the problem; (3) review of the literature; (4) formulation of undertaking: (a) classification of elements, (b) determination of data required, and (c) consideration of available data); (5) systemization and analysis of data; (6) interpretation of results—evidence; and (7) exposition. In summary, emphasis was placed on certain pitfalls; that the plan is limited to broad applications, and that it should be used experimentally for the development of ideas.

DR. J. H. STERNER ("The Uses, Availability, and Selection of Radioactive and Heavy Isotopes in Industrial Toxicology") called attention to the great amount of publicity on tracer materials. The stable and radioactive isotopes have definite uses. The stable isotopes are natural forms of the element and need sources of enriched material and procedures to distinguish differences in concentration by use of the mas spectrometer. There are several sources of the stable compounds, H_2; C_{13} in 10 and 20% and recently available in 48%; N_{15} in 14, 30 and 60%, and O_{18} through the commissions. There is a great number of radioactive materials available but these are in various forms and need to be checked. The cost varies from several dollars to $50 a millicurie. Applications are investigated and, if amounts or kinds are hazardous. further investigation is made. There is little in the literature relative to the application of these compounds. The most common application is simple administration to animals and studies of absorption effects and excretions. There is some difficulty in the identification of substances, such

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Cold Sequelae

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The best time to fight the sequelae of the common cold is *before* the infection develops . . . *before* the colds-susceptible worker has succumbed to the debilitating effects of its secondary invaders.

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ORAL BACTERIAL VACCINE

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It is recognized that there are differences in medical opinion regarding the value of oral bacterial vaccines—and that there are some individuals who seem to be resistant to any type of respiratory vaccine. However, the published reports of a number of clinicians indicate that Oravax will, in a high percentage of cases, build an important measure of protection against secondary invasion by the organisms included in the formula.

These results suggest the desirability of a thorough trial of Oravax, as a means of reducing the severity and duration of cold sequelae among the personnel under your care.

Oravax is simple to administer . . . costs less than 1c per day per employe. Free educational material is available to aid you in presenting and administering the program. Write—TODAY—*for complete information.*

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as metabolites, particularly with reference to the original compound, beyond certain steps. Two techniques are of value in radioactive materials: (1) the measurement of localization, and (2) the making of an original autoradiogram and comparing with a normal x-ray. There is still considerable complicated technique in the use of some compounds. In the use of stable isotopes there is no hazard, but with unstable there is considerable hazard—we are still learning the limits of application, and caution is necessary.

DR. H. F. SMYTH, JR. ("Further Experience with the Range-Finding Test in the Industrial Toxicology Laboratory") stated that the range-finding toxicity test was first described in 1944. It is a collection of abbreviated techniques for quickly and economcially estimating the magnitude of the important health hazards of new chemicals. The present communication extends the test to include the effects of chronic toxicity and allergic dermatitis. The inhalation step has also been extended to cover relative toxicity from known concentrations, as well as the former relative hazard from saturated vapors. The speaker stressed the fact that range-finding methods are intended for preliminary study of a chemical before its commercial production is assured, and before the nature of its technical applications is known with certainty. The results allow prediction of the hazards of manufacture and the safety of various possible applications, but they are in no sense final detailed physiological data. As examples of the method, data upon a number of chemicals are tabulated, much of it not previously published.

MR. JOHN E. DUNN ("Photosensitization of the Skin by Petroleum Solvents") discussed experience with petroleum derivatives as by-products of aviation gasoline, which were tested for skin irritation in order to determine suitability of solvents for DDT and other substances. Patch tests were made on the arms and forearms of various individuals. It was found that several of these petroleum derivatives produced sensitization of the skin to sunlight exposure—the reaction varying with the depth of color of the solvent. The spectral region responsible was determined by filters and found to be near ultra-violet, between 3200 and 3600 Ängstrom units. All the compounds producing sensitivity exhibited absorption bands in this region. Severest reaction took place when the excess of solvent was removed, as an excess affords protection. The spectral region differed from that of sunburn but the latent period was shorter. Irritation was observed from a few minutes of exposure to summer sunlight even with the weakest sensitizers. The quantitative action spectra and the dosage determinations were not made. These preliminary experiments will serve as a guide to interested manufacturers.

Wednesday, April 30

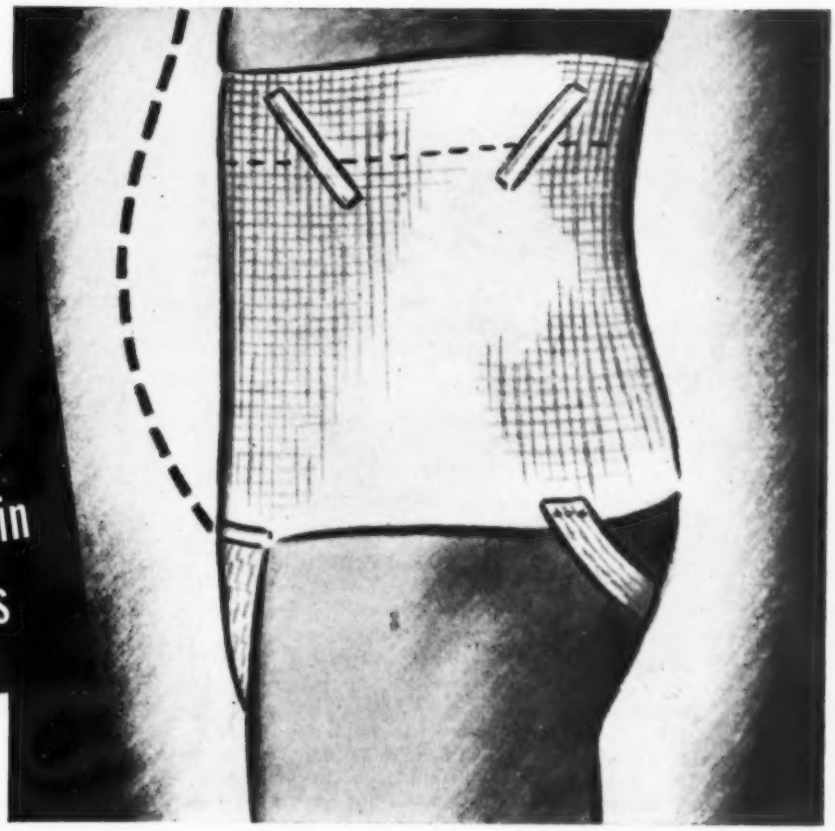
DR. HENRY S. BROWN, General Convention Chairman, introduced the Presidents of the participating groups, who replied with addresses which were models of brevity.

MR. KENNETH M. MORSE, President of the AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS, stated that all of the groups in the meetings had a common purpose, and that there were valuable associations and interrelationships through these meetings, by which combined services are made available.

MR. FRANK PATTY, President of the AMERICAN INDUSTRIAL HYGIENE ASSOCIATION, said that it was well for all of the groups to sit down together; 'we must not, however, let human desire for recognition obscure our common objectives. Through competent administration of our common objectives and through teamwork, we can foster a feeling of good fellowship and obtain results not otherwise possible.'

MISS CATHERINE DEMPSEY, President of the AMERICAN ASSOCIATION OF INDUSTRIAL NURSES, believed that there were great benefits from combined meetings of this sort and, although the nurses' group is young as an organization, it proposes to make its contribution for the good of all of the organizations assembled.

You'll find the CHESTERFIELD SUPPORTER BELT helpful for general abdominal support in these 10 conditions



1 Poor posture

2 Relief of back strain

3 Relief of functional gastric disturbances due to ptosis of the abdominal organs

4 Post-operative support

5 Retention of post-operative dressings—particularly colostomies, varicocele

6 Retention of dressing for pilonidal cysts

7 Diastasis recti

8 Supportive treatment of abdominal hernia

9 Hypotension due to splanchnic pooling

10 Obesity

A doctor soon becomes wise in human nature—and its harmless vanities.

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The Chesterfield is made by Johnson & Johnson—famous for fine surgical products for fifty years. Ten-inch waistband of the finest elastic fabric. Two-way stretch. Porous, elastic mesh pouch with convenient fly-front. Available at drug, department and men's wear stores. A remarkable value at $3.50.

Suggest its use where indicated.

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DR. JAMES M. DUNNING, President of the AMERICAN ASSOCIATION OF INDUSTRIAL DENTISTS, thought that the combined meetings of the Associations presented opportunity for cross-fertilization of ideas. The industrial dentists thus far constitute a small group, but they have great interest and virility.

DR. LOYAL A. SHOUDY, President of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, traced the development of the safety program which was the father of the modern industrial health movement, noting gradual expansion in the use of increased personnel in present-day industrial health programs.

The papers of the Wednesday morning program, by COL. STAFFORD L. WARREN, DR. FRED A. BRYAN, and MR. ROBERT BUETTNER, on "Hazards Incident to the Use of the Atomic Bomb," were published in INDUSTRIAL MEDICINE, 16:6, 275-281, June, 1947, as was also the paper of DR. JAMES H. STERNER on "The Bikini Experiment—The Largest Single Industrial Hygiene Project in History," representing DR. STERNER'S comments on the sound motion picture of the Bikini Experiment.

DR. W. P. YANT presented the DONALD E. CUMMINGS MEMORIAL LECTURE. DR. YANT reviewed the history of the AMERICAN INDUSTRIAL HYGIENE ASSOCIATION which has as one of its main purposes "free exchange of information on exposures and industrial hazards." He stated that "much has been said about the training of industrial physicians, but little about that of industrial hygienists." A purist type of thinking should not determine the curriculum because the AMERICAN INDUSTRIAL HYGIENE ASSOCIATION must welcome the infusion of other professional fields if it is to progress. Imposing courses upon already burdened curricula of other technical fields results in "stuffing" courses, without proper over-all integration of subject matter. DR. YANT lamented the emphasis given to "safety first" which should be shifted to "production with safety," thus inspiring more confidence in industrial hygienists by industry—too often the economic factor has been overlooked. Good teachers, texts and research programs are required before training can be accomplished efficiently; to prove this point DR. YANT challenged anyone to mention a field of production in which a basic research program on industrial hygiene is not needed.

DR. LESLIE SILVERMAN ("Ventilation for Cotton Textile Processes") reviewed a study now in progress for the determination of air contamination in cotton textile mills. New sampling equipment was described, and air-flow data were given on cotton cleaning processes. Figures were also given on testing the effiicency of condensers and filters.

DR. CHARLES R. WILLIAMS ("Evaluation and Control of Exposure to Mercury and Mercuric Oxide in the Manufacture of the Ruben Cell, a New Dry Battery") outlined methods for handling of these compounds. Air contamination was measured and urinary excretion determined. Particular attention was directed to the construction and maintenance of floors—it being considered easier to prevent such difficulties than to clean up badly conducted areas.

Periodic air measurements were recommended as a check, supplemented by medical and dental examinations periodically.

MR. W. W. STALKER ("A Study of the Hazards of Exposures to Lead and Zinc Fumes in Brass Foundries") summarized a statewide survey of five foundries in Kentucky. This survey included two series of atmospheric samples, 124 for lead, 112 for zinc, and lead absorption tests on 98 employees. From this experience it is believed that urine and blood analyses are better indications of total lead exposure and absorption than the use of stippled cells or air sampling periodically. The examination of 75 employees suggested that many brass foundrymen apparently have mild lead effects. Control was exerted by two methods—process control (including engineering methods of fume control), and a general hygienic program (comprising certain medical and sanitary procedures).

An evening panel session was held on the subject "What's New in Industrial Medicine?" in which the participating "experts" were DR. A. G. KAMMER, DR. EARL LUTZ, DR. MEVILLE H. MANSON, DR. MELVIN N. NEWQUIST, DR. WILLIAM A. SAWYER, and DR. HAROLD A. VONACHEN, with DR. OSCAR A. SANDER presiding. The full text of these discussions was published in INDUSTRIAL MEDICINE, 16:6, 313-324, June, 1947.

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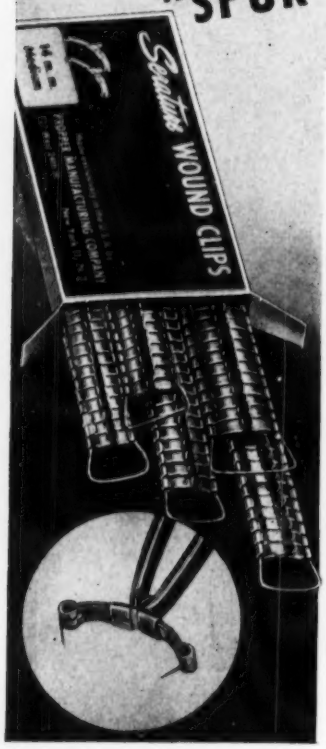

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Thursday, May 1

DR. C. R. FRICKE ("Growth of an Industrial Dental Program in a Pittsburgh Industry") outlined the elements of a dental program in industry, emphasizing the necessity for dental care as part of an over-all health program. DR. FRICKE also called attention to the service rendered by the Philadelphia Company, which operates Pittsburgh's street cars and buses, and requires dental x-rays of all of its employees. By this means defects "by the hundreds" have been referred to private dentists.

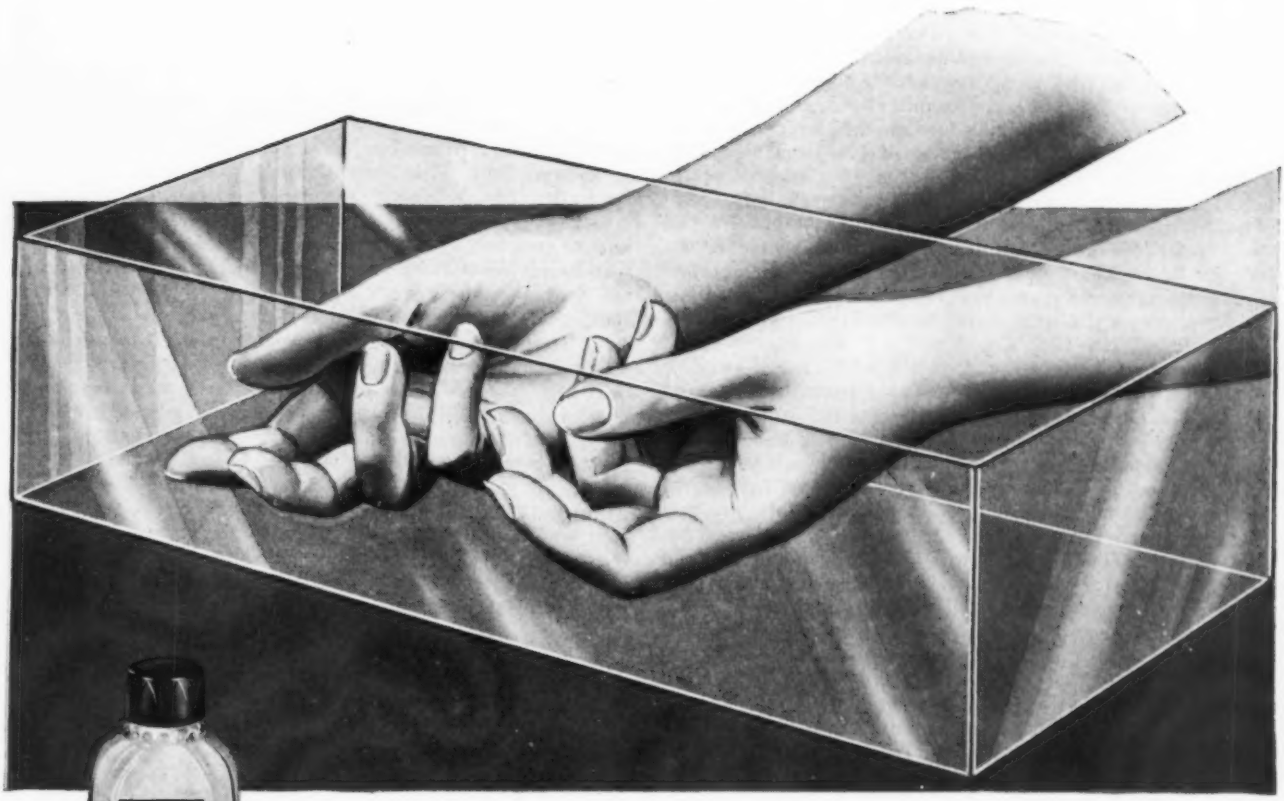
MR. V. K. LAMER ("Solid Aerosols") observed that particles in the medium-size range probably reach the alveoli of the lungs in the largest numbers; the large particles have great inertia and impinge on the hairs and walls of the respiratory passages. The same phenomenon is observed with respect to the smallest particles because of the Brownian movement and the so-called zigzag motion. The best methods of dispersing powdered materials to form solid aerosols were by use of a pneumatic spraying apparatus (Geyser) and pneumatic explosions in a high pressure bomb.

DR. W. L. DOYLE ("Passage Through the Nose and Deposition in the Lung of Particles of Measured Size") had used sprays of sodium bicarbonate and corn oil, and also methylene blue and penicillin in the particle size studies. Determination of particle size was made by the cascade impactor of K. R. May. The median mass diameter at which 50% of material penetrates the nose at 17 liters per minute was approximately 2 microns—at higher flow rates, the size was smaller and for less dense particles, the size was larger. For sodium bicarbonate at 17 liters per minute, the 50% deposition value in the lungs was 0.75 micron. At increased breathing rates, size was smaller and for less dense particles the size was larger. The values for penicillin agree with the sodium bicarbonate values. Evidence was obtained for the minimum retention of particles from 0.2 to 0.3 micron.

DR. HAROLD HODGE ("Particle Size in Relation to the Toxicity of Uranium Dioxide") outlined the phases of this investigation as to sampling and measurement of particles; size fractionations; measurement of retention; and toxicity of fractions. Equal weights of each size fraction (ranging from 0.2 to 8 microns) were injected into the lungs of rats by an intratracheal technique. Sizes of 10 microns and above showed no definite toxicity. Injection of 1.5 micron and smaller particles showed definite symptoms, increasing in intensity with smaller sizes; for example, with 0.2 micron, 25% loss of weight occurred in one week, 300% increase in non-protein nitrogen, and 98% decrease in phenol red excretion.

THEODORE F. HATCH ("Influence of Particle Size in Dust Exposures") posed two problems in particle size effects: (1) determination of amount and size of dust penetration and retention by the alveoli; and (2) determination of the toxicity of deposited dust in the alveoli. Alveolar retention is approximately 60% at 1 micron, falls off to approximately 10% at 5 to 6 microns, and is approximately 30 to 50% under 1 micron. Relative toxicity varies with the solubility rate (although the relationship is really more complex than that) with a rapid increase in toxicity as size decreases, slight changes in size making considerable difference in relative toxicity. Flocculation is another factor with which we are concerned—the respiratory system does not shatter particles. A new device was demonstrated (a spiral attached to a midget impinger, the inside being coated with adhesive material) and spiral curves were shown regarding particle size for typical dusts. Lantern slides illustrated patterns produced by different kinds of flocculation. Emphasis was placed on the need for the evaluation of flocculation. Much more research is needed on the relationships of particle size.

DR. MILTON H. KRONENBERG ("Progress in Teaching of Industrial Medicine in American Medical Schools") reviewed the experience with the raising of standards of



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medical education, stressing the need for alertness in molding education to the needs of the times. Those responsible should anticipate the needs of the coming 25 years. It is also essential that educators be familiar with industrial problems. The fundamentals of industrial medicine should be included in undergraduate courses, including consideration of the scope, the ramifications, the objectives and the future of industrial medicine. The problem of better teaching is not new, because it has been discussed by various bodies. Letters were sent to 72 medical schools, of which 44 replied showing that there was little participation in industrial medical teaching. Also in 1928 the Accident Boards and Commissions outlined a course. In 1939 the Council of Industrial Health of the A.M.A. tabulated a questionnaire secured from 59 schools, showing that there was little uniformity in the teaching of industrial medicine. In 1941 Dr. Frederick Wampler secured questionnaires from 76 schools, of which 51 showed varying hours with an average of six hours of industrial medical teaching; 28 used field trips; 20 replied that the hours of teaching had been increased; 35 offered a course in the department of preventive medicine and public health, and seven in bacteriology and hygiene, four in several other courses, and two in general medicine. Only two had designated departments. In 1943, the A.M.A. collected additional data showing that more time was being devoted to the teaching of industrial medicine, the average running from 5 to 9.6 hours. Twelve additional schools had been added to those previously surveyed, but seven were devoting less time to the teaching of industrial medicine, and three had discontinued it altogether because of lack of personnel. In 1945, the combined committee of the A.M.A. and the A.A.I.P.&S. sent questionnaires to 69 schools with a response of 49; 15 used the same hours as in 1943 (the average being 6.2 hours), 15 had decreased the hours reducing them to 4.8 hours, and 19 had increased the hours to a 4.5 average. There was an over-all increase of about 1/3 hour. There was a reduction in the number of field trips and 23 schools had indicated expansion in their courses. In conclusion it was stated that much remains to be done and much can be done through the association of proper groups in promoting better teaching of industrial medicine.

DR. ERNEST W. BROWN ("Progress in the Teaching of Industrial Medicine in American Medical Schools") exhibited lantern slides with statistics relating to experiences and conferences in 28 medical schools with respect to the teaching of industrial medical courses. The clock hours devoted and their percentages of these schools were 1 to 2—7%; 4 to 6—18%; 8 to 12—29%; 15 to 18—21%; and 20 to 33—14%. With respect to field work, 44% of 25 schools included this, but there was a great variation in the amount of field work done. The departments in which industrial medical instruction was given in 25 medical schools showed the following percentages: bacteriology 4%; medicine 8%; separate department 12%; and public health 76%. As to the administration, in 25 medical schools, 20% were on full time; 36% were on part time, and 44% were non-specific. With regard to the curriculum, 40% showed what was known as integrated scope; 21% a restricted scope; 28% gave few topics; and rone or ill-defined, 11% in 28 different medical schools. Great variation was noted in this study of industrial medical teaching as to time, subject matter, and various other phases which are to be studied in further detail and suggestions made for improvement.

DR. HARVEY B. ELKINS ("Characteristics of Absorbing Devices") said that such devices should be chosen on the basis of portability, capacity, efficiency, simplicity, and adaptability. Included in the discussion were such devices as bubblers, glass bead columns, solid adsorption devices, and condensation apparatus. Data on efficiency are usually unsatisfactory; factors influencing efficiencies include size of air bubblers, duration of contact, and rate of flow; in gas absorbers the concentration of the contaminant and the strength of the reagent may be im-

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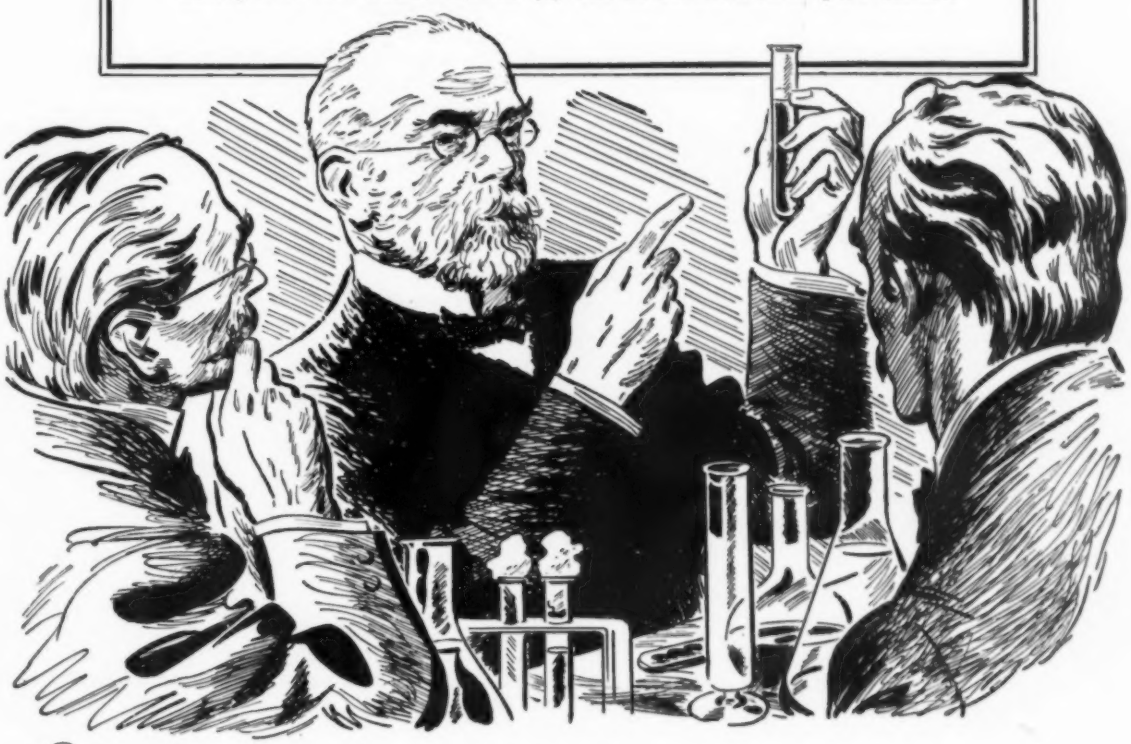

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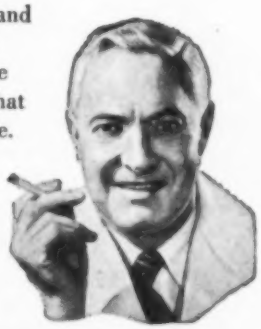

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portant. In the use of non-reacting liquids, efficiency can be determined by the relative volume of air sampled and the liquid absorbent used, but not by the concentration of the vapor. Silica gel methods apparently have many advantages over other methods for the collection of organic vapors. It would be of considerable advantage to have methods standardized so that results in different states might be compared.

WARREN A. COOK ("Review of Automatic Indicating and Recording Instruments"). Previous methods were in many instances laborious and some still are, but there are a certain number of recording instruments which help. Slides were exhibited showing a number of different types. Among the different types considered were (1) heat of combustion of thermopile, an example of which is the carbon monoxide indicator; (2) heat of combustion by electrical resistance, by use of a dial indicating the lower explosive limits—including various types of vapors and gases, apparatus in the form of alarm and portable types; (3) ultra-violet absorbing devices which function for certain vapors only, examples of which are the R & H triper analyzer—ultra-violet photometer—infra-red absorption apparatus—carbon disulphide and hydrogen sulphide recorders—and an autometer for sulphur dioxide recently devised; types of apparatus in this group have wide application for different gases and vapors; and (4) depolarization apparatus for oxygen as devised by the Mine Safety Appliances Co. There is great need for recording apparatus for studying conditions some distance above the earth, and transmitting the results to radio devices on the earth's surface. A considerable number of radioactive devices are now available. In general, more and better types of instruments are needed.

ROBERT F. STAMM ("Interferometry"). Slides were shown of parts of the refractometer and how these function. Stages in the development of a formula for refractivity of gases and also for calibration of refractometers were shown. WILLIAM R. BRADLEY demonstrated the golf bag carrier for ease in transporting the interferometer and using it.

W. G. FASTIE ("Methods of Infra-Red Gas Analysis"). Infra-red spectral absorption permits very selective identification and quantitative analysis of gases, the spectrometer being most widely used. Slides of apparatus, depicting the functions of the apparatus, were shown. Mention was made of military application. At present, such devices are in great demand in process work, but may be applied very efficiently to industrial hygiene investigations.

H. P. KLUG ("X-ray Diffraction Analysis of Dusts"). A special technique is necessary for quartz and other forms of free silica; for the past 10 years x-ray diffraction tests have been made according to the method of Clark and Reynolds. Photographic diffraction methods present some difficulties—they are time-consuming, the weighing and mixing presents problems—the devising of an internal standard for small samples, and obtaining line intensities without superimposition of lines also come within this category. Recently the Geiger-counter spectrometer helps to overcome the two difficulties last named and there is a possibility of avoiding the necessity for an internal standard. The use of the Geiger-counter spectrometer apparently takes the same amount of time, but this may be shortened appreciably.

DR. ARTHUR S. ADAMS, Provost of Cornell University, was the principal speaker at the dinner meeting of the combined associations on the subject "The Role of the University in Providing a Workshop and the Tools for the Advancement of the Medical and Social Sciences." The well-being of industry is dependent upon the well-being of the individual worker. If the individual worker were made to feel that he counts, a great many of our industrial problems would subside. When the worker is aware that his individual effort counts in the over-all effort, then he is willing to put the welfare of the industry above his individual aggrandizement and desire for personal success.

Friday, May 2

A PANEL discussion on "Inservice Education of the Nurse in Industry" was the feature of a joint meeting of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS and the AMERICAN ASSOCIATION OF INDUSTRIAL NURSES.

DR. J. J. WITTMER ("Medical Director's Responsibility"). This is a broad field covering many services and these vary in different groups. The medical director is responsible for an efficient courteous service and the nurse being the first contact is, therefore, of great importance. The training program includes (1) selection, much being covered under this heading in interviews by the medical director; (2) orientation, which consists of a knowledge of induction, the responsibility of the health department in the whole organization, the labor-management picture, and an appreciation of the possibilities of nursing services; (3) setting the pattern of training (which depends upon the group) includes an appreciation of the kind of service which should be rendered, acquaintance with co-workers, provides an opportunity to have personal facilities appraised, and also presents the possibility of a rotating service; (4) observation and evaluation of progress—observations should be made on an informal basis, and criticisms should be rendered individually and in private; (5) coordinating and counseling activities—although one cannot overlook dissension, much clear thinking and prompt action is necessary to keep up proper morale—understanding counsel and the willingness to listen are factors to be greatly encouraged under these activities. Finally, the medical director's attitude is reflected in his staff and the services rendered—one cannot delegate terminal responsibility.

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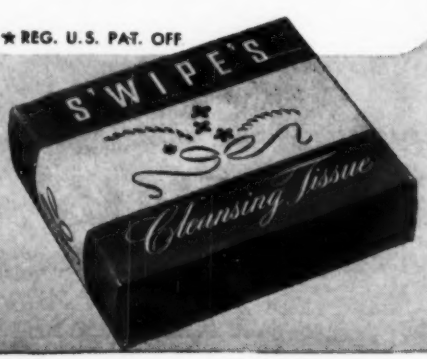

PALMER BEVIS ("Management's Interest"). The nurse is in a unique position to gain confidence, straighten out tangled thinking, and explain company policy. It is her job to bring workers "back on the beam." The ideal nurse likes people, is kind, is possessed of integrity, responsibility, tact, commonsense and openmindedness. She is also well informed respecting insurance and compensation and in the preliminary detecting of illness and injury. A questionnaire put out by the National Association of Manufacturers concerning industrial relations policies and medical service was referred to in the course of this discussion as a reliable basis for appraising management's interest.

MRS. KATHLEEN K. DEMPSEY, in the absence of Elizabeth Comstock, concluded the panel on "The Nurse's Needs." A program of orientation and continuous education is necessary in establishing good industrial nursing principles. This should not be mechanistic or essentially materialistic because of the human factors involved. This was difficult during the war, but is now more feasible. Included should be tours of the plant and acquainting the staff with processes and materials and the possibilities of hazards, the use of protective devices, and similar principles. The nurse is very often responsible for the safety program, especially in small plants and should be informed on compensation problems, labor and management difficulties, and cooperate sympathetically with the personnel department in the suggestion and clarification of policies. In small plants, management might well arrange conferences with out-of-plant medical personnel. The keeping of adequate and reliable records, with proper maintenance and use of them, is of the greatest importance, as is a knowledge of the budget. Education should be continuous with respect to changes in the administrative policy and technical problems, with follow-up. Staff meetings are of advantage and should be called for specific discussions. Reviews of community resources, changes in contracts, the consideration of visual educational means, and the knowledge of contemporary literature, are also factors in the success of the program. In summary, the nurse's needs can be met by adequate response to the challenge of incessant change, through orientation and continuous education.

INDUSTRIAL HEALTH and DISEASE

Shooting Gallery Lead Poisoning

AN ATTENDANT at a shooting gallery in Baltimore was found to have lead poisoning when a specimen of his blood was submitted to the City Health Department laboratories for analysis on March 18, 1946. Following this diagnosis, air tests were made at the shooting gallery where the patient had been working and it was determined that significant amounts of respirable lead dust are released into the air upon the impact of lead bullets against a steel target. Two more cases of lead poisoning among attendants at a different shooting gallery occurred in April, 1946. One of these was very sick and remained in a hospital for more than two weeks. This man had just been assigned additional "clean-up" duties at the shooting gallery after the discovery of the first case there, and the severity and acute nature of his illness probably resulted from these exceptional exposures to lead dust. Environmental studies of this and 13 other indoor shooting galleries in Baltimore revealed that the atmospheric concentrations of lead dust exceed many times the permissible safe limit. The extent of the air pollution was substantiated upon examination of settled dust on horizontal ledges near the firing positions in a number of galleries. It was found that the major portion of the dust usually was composed of small metallic lead particles. Since the occurrence of poisoning by metallic lead is very uncommon, the composition of the dust was determined chemically and the results confirmed by an x-ray diffraction examination made by Professor J. D. H. Donney, of the Department of Geology of the Johns Hopkins University. One further case* of lead poisoning in a shooting gallery attendant in Baltimore had come to the attention of the City Health Department in 1942, when a physician submitted a specimen of the patient's blood for laboratory analysis. This patient was hospitalized and the record indicates a two-year span of work in a shooting gallery and a diagnosis of chronic lead poisoning. None of the four Baltimore cases proved fatal. Pursuing the investigation further, the Division of Industrial Hygiene, with the assistance of the Division of Chemistry of the Baltimore City Health Department, fired experimentally 11 types of .22 and .38 caliber bullets supplied by leading small-arms ammunition manufacturers. All air tests made at the firing position showed excessive dust concentrations with the target located at a distance of 35 feet. Other data indicated that there was no apparent correlation between the amount of dust produced and the muzzle velocities, weights of the projectiles or composition of the bullets, and that the rise in temperature upon the impact of the bullet with the target was insufficient to volatilize the lead. Later an unusual opportunity arose to study clinically and environmentally the effects of exposures of two weeks' duration when a large law enforcing agency held its first target practice in four years. Pistols firing .35 caliber ammunition were used in eight galleries each attended by a range master. At the conclusion of the practice period, blood specimens were obtained from the attendants and analyzed for lead. Although the blood of unexposed persons may con-

*In addition to the four Baltimore cases, the only reference now known to this unusual problem among shooting gallery attendants is in case report No. 12 (page 412) in the article entitled "The Treatment of Lead Poisoning by Sodium Citrate" by Seymour S. Kety, M.D., and T. V. Letonoff, M.S., from the Division of Biochemistry and the Medical, Neurological and Surgical Services of the Philadelphia General Hospital. (*The American Journal of the Medical Sciences*, Vol. 205, March, 1943, pp. 406-414). The case here reported, a patient in the Philadelphia General Hospital for nine days during April, 1942, was a white male, age 30, a shooting gallery attendant for six months who was admitted with anorexia, constipation, vomiting, lead line, stippling 4+, and very severe colic.

systemic detoxification

in arthritic therapy

The often stressed concatenation of gastro-intestinal malfunction and the arthritic syndrome[1,3,4]—and the modern concept of arthritis "as a systemic disease having local manifestations in the joints"[2]—again focus attention on the value of routinely administering a saline detoxicant-eliminant, such as Occy-Crystine, in the management of the arthritic patient.

The relief achieved under Occy-Crystine administration derives from its effective four-fold action:

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The Sulfur-Bearing Saline Detoxicant-Eliminant

1. Bassler, A.: Med. Record, 153:20, 1941.
2. Osgood, H. A.: Connecticut M. J. 5:28, 1941.
3. Pemberton, R.: Rev. Gastroenterology, 9:91, 1942.
4. Spackman, R. W. et al.: Am. J. Med. Sci., 202:68, 1941.

tain about 0.03 milligrams of lead per 100 grams of blood, the results of the eight specimens showed blood lead content that ranged from 0.040 to 0.082 milligrams. Air tests were made in three of the galleries during actual practice and the results showed that the lead dust was from seven to 66 times the maximum allowable concentration (0.15 milligrams per cubic meter of air) under the state and city regulations adopted pursuant to the authority of the state occupational disease control law. Having established the nature of the exposure to lead dust in shooting galleries, the final phase of the investigation was devoted to developing a method for controlling the hazard. Exhaust ventilation principles based upon conventional designs were impractical because of the large volume of air required for the removal of the dust. A modified "push-pull" system was employed with an air curtain maintained at the firing line, while an exhaust fan operated behind the target. Following this installation, dust samples collected from the air disclosed that the concentration was well below the maximum allowable limit even when rapid firing was taking place. The technical features of the newly designed protective system, together with accompanying engineering data, may be secured from the Division of Industrial Hygiene of the Baltimore City Health Department.

—*Baltimore Health News*, June, 1947

Iowa's Occupational Disease Law

THE Occupational Disease Compensation Law enacted during the meeting of the last legislature will have considerable importance to the medical profession in Iowa. This importance may be expected to increase as industrial activity in the state grows. The law, as enacted, is designed to extend the scope of the existing Workmen's Compensation Law, which covered accidental injuries only, to include workers incurring disablement or death from exposures to industrial health hazards. Disablement is defined in the law as the event or condition where an employee becomes actually incapacitated from performing his work or from earning equal wages in other suitable employment. Important phases of this statute are outlined in the following paragraphs.

Scope of Law: The new law is of the schedule type, defining and covering 16 conditions or diseases. It will be administered by the State Industrial Commissioner, becoming effective on October 1, 1947, and is not retroactive beyond that date. Employers may, at their own expense, require employees to submit to a physical examination prior to October 1, 1947, and within 90 days of employment after that date. If an employee is found to be suffering from or affected by an occupational disease, the employee may be required to waive any claims of compensation under the provisions of this law as a condition to continued employment. *Occupational Diseases Defined*: The law defines occupational diseases as those which (1) arise out of and in the course of the employment; (2) have a direct causal connection with the occupation; (3) follow as a natural incident from injurious exposure occasioned by the nature of the occupation; (4) must be incidental to the character of the occupation; and (5) must not be independent of the employment. Under the law, only those specifically listed will be considered as compensable occupational diseases. No employer shall be liable for any compensation for an occupational disease unless the disease is due to the nature of the employment in which the hazards actually exist, are characteristic of and peculiar to the occupation, and the disease actually arises out of the employment. *Schedule of Compensable Diseases*: The schedule includes: (1) lead poisoning; (2) mercury poisoning; (3) poisoning by nitrous fumes; (4) poisoning by carbon monoxide; (5) poisoning by benzol or by nitro and amino derivatives of benzol (dinitrobenzol, aniline) and other aromatic hydrocarbons or their preparations or compounds; (6) dermatitis; (7) zinc poisoning; (8) manganese poisoning; (9) brusitis, synovitis, or tenosynovitis from continued or repeated pressure on the parts affected; (10) chrome ulceration of the skin or nasal passages; (11) cyanide poisoning; (12) brucellosis; (13) erysipeloid from swine; (14) silicosis; and (15) conjunctivitis from radiant energy. *Limitations on Brucellosis*: The law

Summary of the Iowa Law, prepared by Industrial Hygiene Section, Division of Public Health Engineering, State Department of Health.

"Total" Therapy

FOR INDUSTRIAL DERMATITIS

"The therapy of a majority of the cases of contact dermatitis encountered in industry", according to the noted dermatologist, Dr. Frank C. Combes[1], "requires no further medication than the intelligent use of a *good buffer solution such as Liquor Aluminum Acetate (Burow's solution)* . . . and a *good crude coal-tar paste.*"

His preference for wet dressings solution is **Domeboro Tabs** ("widely used in industry", particularly by Parkes[2] at Curtiss Wright for cutting-oil dermatitis)—because it is "a convenient tablet which, when dissolved in water, releases a *lead-free aluminum acetate in appropriate dilution,*" with a substantial percentage of boric acid.

The *crude coal-tar paste* used at New York University, according to Combes, "is manufactured commercially under the name **Daxalan**"—which has been found *superior to distillates, filtrates and pastes containing liquor picis carbonis.*

It must be properly applied for "optimum benefit", and Combes advises thinning with **Domolene** for spreading over a large area—because in his judgment its hydrophilic ointment base "does not materially lessen the therapeutic efficacy of the paste."

With tissue repair under way, and only erythema remaining, the use of **Domeboro Ointment** (each ounce of which, in a special hydrophilic base, possesses the therapeutic action of one Domeboro Tab diluted in a pint of water), permits a quicker return to work, while healing is promoted by its efficient topical action.

(1) Combes, F. C.: Indus. Med., July, 1944.
(2) Parkes, Morey: Indus. Med., January, 1944.

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stipulates that the diagnosis of brucellosis must be confirmed by a positive blood culture for brucella organisms, or at least two successive agglutination tests, not less than seven nor more than 10 days apart, which shall be positive in a titer of 1/160 or higher. The specimens for these tests must be drawn by a licensed practicing physician or osteopathic physician, and immediately delivered to the State Hygienic Laboratory of the State Department of Health at Iowa City. Each specimen taken for this purpose must be submitted in a container upon which is plainly printed the following: (1) name and address of the subject; (2) date specimen was taken; (3) name and address of subject's employer; and (4) a certificate by the physician or osteopathic physician that he took the specimen from the named subject on the date stated, over his signature and address. The State Hygienic Laboratory, upon completion of the test, will send a report of the result of the test to the physician or the osteopathic physician from whom the specimen is received and also to the employer. *Provisions for a Medical Board*: The law provides for a medical board whose purpose is to investigate all controversial medical questions and compensation claims, and to report its findings to the Industrial Commissioner. This board will consist of the Industrial Hygiene Physician of the State Department of Health and two physicians selected by the Dean of the College of Medicine.

DR. PILGRIM

IN CONFERENCES with DRS. HOLMBLAD, SLOBE, PETERSON, BROWN, and ARSTAD, on problems of establishing requirements for fellowships and residencies in industrial medicine. . . . AND much desk work on the final assembling of data, photographs, record forms, floor plans, and other procedures of the survey on industrial health department functions and relationships. . . . AND conferences here and there with chemists, hygienists, and others on current problems; and with DR. HENRY C. SWEANY concerning pathological slides of lungs in a case of alleged silicosis. . . . AND meeting brother EMMETT, arriving from the Pacific Coast on the hottest day of the year thus far; and taking time off to bask in the sun on the shore, and in the evening, with libations and higher mathematics, and coming out very well; and next to see old cronies at the ball field, and again at the bowls, and not so good; and later to look upon the contests of lawn bowls, delightful on a warm evening. . . . AND again at the desk and checking galleys and manuscripts for subsequent publication; and then to Pittsburgh to deliver in person the *magnum opus* on industrial health department experience, going over the same in some

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detail with JOHN MCMAHON, WES HEMEON and DR. RICHARD WALMER, and meeting two new members of the staff of Industrial Hygiene Foundation, H. M. CHAPMAN and J. F. MORGAN; and then to dine with the WALMERS at the country club, whence back to the house for libations and music, including Tschaikowsky's "Romeo and Juliet," Chausson's Symphony, Cesar Franck's Symphony in B Minor, and many other old favorites; and next day to Foundation headquarters for further conferences and a two-hour interview with a representative of *Wall Street Journal* anent the field study; and in the evening to dinner with the HEMEON'S, with libations, and then a rush to the train. . . . AND now a little time away for recreation, and with the softball cronies, and in the evening to the club to see the fireworks, and later more bowling, and to the FAIRBAIRNS for dining, music and counting the spots. . . . AND concerned with a medico-legal problem, with special examinations and appearance before the commission in an alleged case of silicosis, in which there was neither exposure nor effects; and in conference with DRS. PISZCZEK and BLANKENSHIP concerning qualifications and certification for specialists in public health and preventive medicine. . . . AND to a plant where was an organic vapor problem and taking samples of the air at various locations and processes; and the way back viewing an international event: two negro women talking with their hands between Maxwell (Jewish quarter) and O'Brien Streets. . . . AND in conference with engineers on various types of production and hygiene problems, meanwhile concerned with the publication of manuscripts and articles. . . . AND viewing with considerable interest a "March of Time" entitled "Doctors 1947"—noting particularly an element of industrial medicine inserted and that particular emphasis was placed on the work of the New York Academy of Medicine. . . . AND an inspection visit with an engineer to a plant where was a dust problem, and concerned with both hygiene and engineering process revision, a most interesting combination occurring more frequently than many believe. . . . AND thence to dinner at the club with MISS VERA LOWE, chief nurse on DR. DONALD HUNTER'S staff at the London Hospital, finding her indeed a delightful personality, in telling her experiences to MESDAMES PILGRIM and CUMMINGS. . . . AND studying problems, including one of public liability in a nearby state, another of public liability in a nearby city, and several in industrial plants; and enjoying converse at luncheon with DR. CARL PETERSON concerning many plans and objectives; and to the GARDINERS for a birthday party of daughter CAROL, and enjoying the youngsters with their frolics. . . . WHENCE back to the desk for the dictation of proceedings of meetings and the consideration of various abstracts; and planning of journeys of which more later.

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